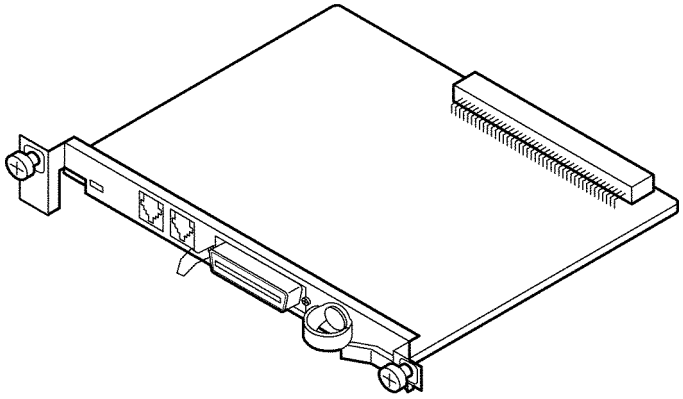
ORDER NO. KMS0805493CE
F19

Service Manual

24-Port Single Line Telephone Extension Card with Caller ID

Model No. KX-TDA6178

(for U.S.A.)



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product, the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

When you note the serial number,write down all 11 digits. The serial number may be found on the bottom of the unit.

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TABLE OF CONTENTS

PAGE

1 Safety Precautions ---- **3**
1.1. For Service Technicians ---- 3
2 Warning ---- **3**
2.1. About Lead Free Solder (PbF: Pb free) ---- 3
3 Specifications ---- **4**
4 General/Introduction ---- **4**
4.1. General Description ---- 4
5 Technical Descriptions ---- **5**
5.1. Block Diagram ---- 5
5.2. Circuit Operation ---- 6
6 Location of Controls and Components ---- **18**
6.1. Names and Locations ---- 18
7 Installation Instructions ---- **19**
7.1. ECSLC24 Card ---- 19
7.2. Fastening Amphenol Connector ---- 21
7.3. Power Failure Connections ---- 22
8 Troubleshooting Guide ---- **25**
9 Miscellaneous ---- **32**
9.1. Terminal Guide of the ICs Transistors and Diodes ---- 32
9.2. How To Replace a Flat Package IC ---- 33
9.3. Memo ---- 34
10 Schematic Diagram ---- **35**
10.1. Block Diagram ---- 35
10.2. No.1 ---- 36
10.3. No.2 ---- 38
10.4. No.3 ---- 40
10.5. No.4 ---- 42
10.6. No.5 ---- 44
10.7. No.6 ---- 46
10.8. Waveform ---- 47
11 Printed Circuit Board ---- **50**
11.1. Component View ---- 50
11.2. Bottom View ---- 51
12 Appendix Information of Schematic Diagram ---- **52**
13 Exploded View and Replacement Parts List ---- **53**
13.1. IC Data ---- 53
13.2. Cabinet and Electrical Parts Location ---- 56
13.3. Accessories and Packing Material ---- 57
13.4. Replacement Parts List ---- 58

1 Safety Precautions

1.1. For Service Technicians

- Repair service shall be provided in accordance with repair technology information such as service manual so as to prevent fires, injury or electric shock, which can be caused by improper repair work.
  1. When repair services are provided, neither the products nor their parts or members shall be remodeled.
  2. If a lead wire assembly is supplied as a repair part, the lead wire assembly shall be replaced.
  3. FASTON terminals shall be plugged straight in and unplugged straight out.
- ICs and LSIs are vulnerable to static electricity.
  When repairing, the following precautions will help prevent recurring malfunctions.
  1. Cover plastic parts boxes with aluminum foil.
  2. Ground the soldering irons.
  3. Use a conductive mat on worktable.
  4. Do not grasp IC or LSI pins with bare fingers.

2 Warning

2.1. About Lead Free Solder (PbF: Pb free)

Note:

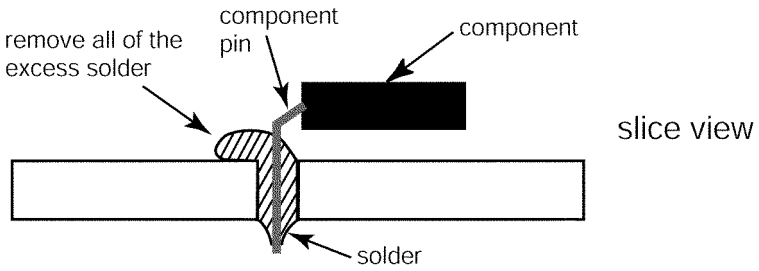
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

Caution

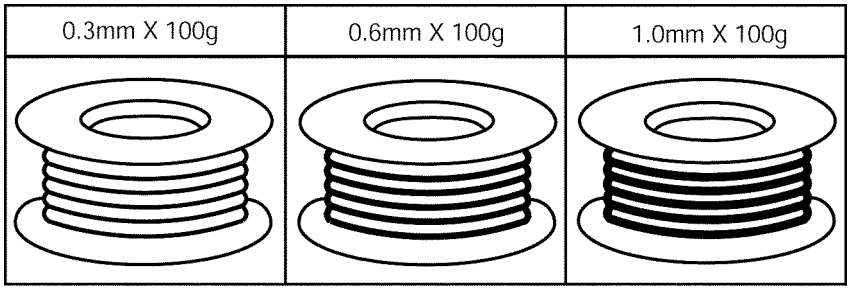
- PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C).
  Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



2.1.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufac turer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



3 Specifications

Functional Block	Functional contents	
Extension Interface	Number of Ports	24 ports
	SLT Interface	-26V 26mA Feeding function (Voltage in ports 1-8 are switched over to -45V, depending on the circuit distance.) Dial-pulse signal detecting function DTMF signal detecting function Bell signal issuing function Hook detecting function Ringtrip detecting function 2W/4W converting function Surge protective function CODEC function • Test function (Loop back, Tone generation) • Programmable digital filtering function • Serial interface function • PIO function
DTMF Receiver	24 lines for each port	
Caller ID (FSK)	24 lines for each port	
On-board Ringer	20/25Hz 75Vrms Phase control (Three-phase / Four-phase)	
On-board DC/DC Power Supply	Input +15V Output +3.3V Input +40V Output: -30V, -55V, +80V	
Power Failure Forwarding Function	4 lines supported	
Self-Diagnostic Function	Carried out with outside-line interface in a pair (only one port) Speech path test, Dial pulse test, DTMF test	
ASIC	EC bus interface function H.100 bus interface function, Digital PLL function Local bus interface function Time switch function, Gain controlling function, FIFO/DPRAM function Intelligent PIO function	
Control Unit	CPU	SH-1/SH7020 (12.288MHz)
	Flash ROM	512Kbyte
	SRAM	128Kbyte
	FPGA	• Interface between codec and CPU • SRAM type (XC3S250E) manufactured by XILINX • CID128 bytes /ch transmission buffer
LED Display Circuit	Card status indicating LED: Two colors (Red/Green)	
External Interface Connector	Extension interface	50pin Amphenol connector: 1
	Power failure forwarding	4pin modular jack: 2

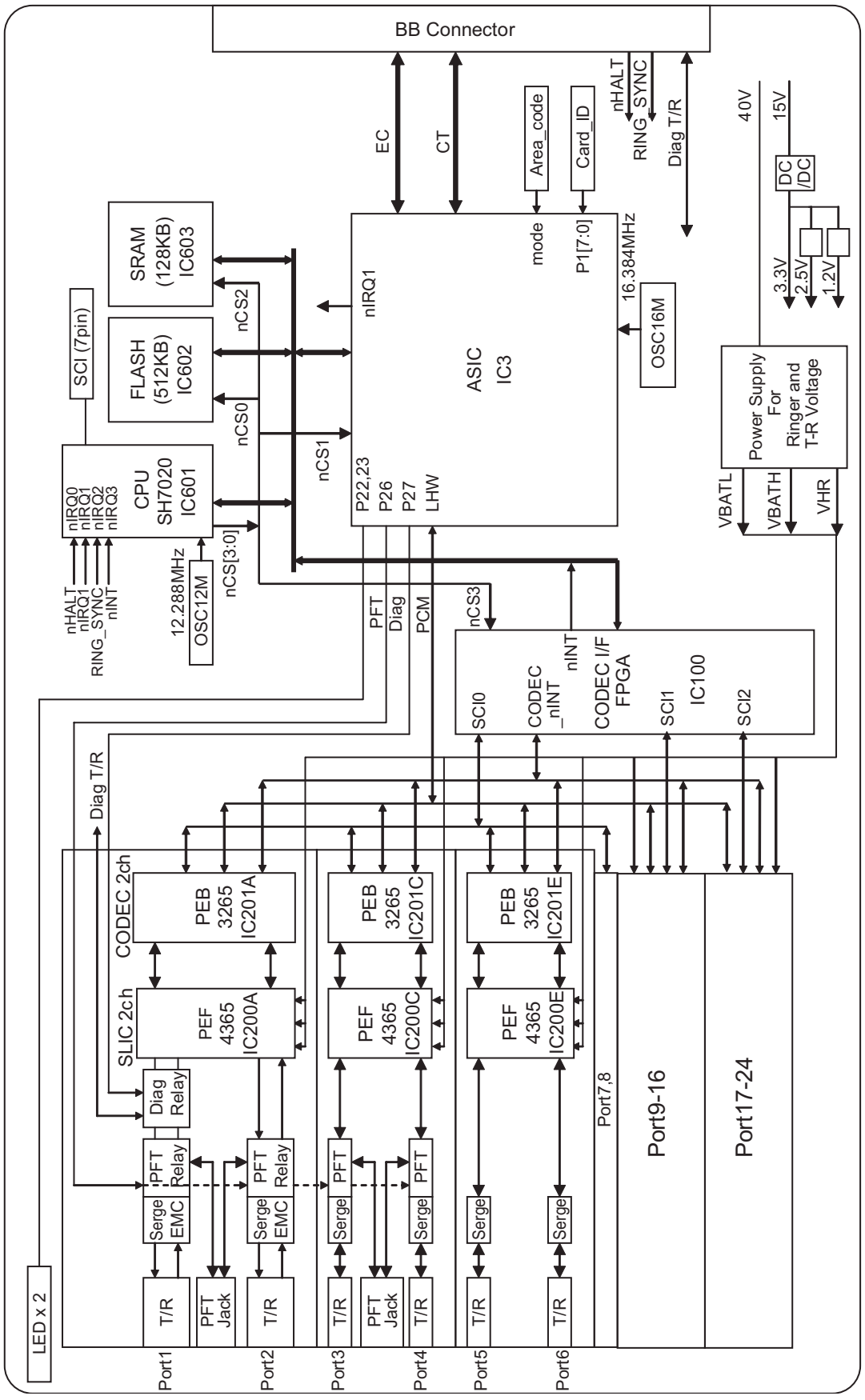
4 General/Introduction

4.1. General Description

This card is plugged into a free slot on the TDA600 systems and randomly connects up to 24 SLT devices.
Can only be installed in shelves in which a PSU-L is intalled.
This card sends Caller ID signal to extension ports.
The LPR is SH-1(SH7020), and the memory is composed of a 512K byte Flash ROM and a 128K byte SRAM.
It also supports a software upgrade by downloading the latest version.

5 Technical Descriptions

5.1. Block Diagram



KX-TDA6178 BLOCK DIAGRAM

5.2. Circuit Operation

5.2.1. Control-System Circuit

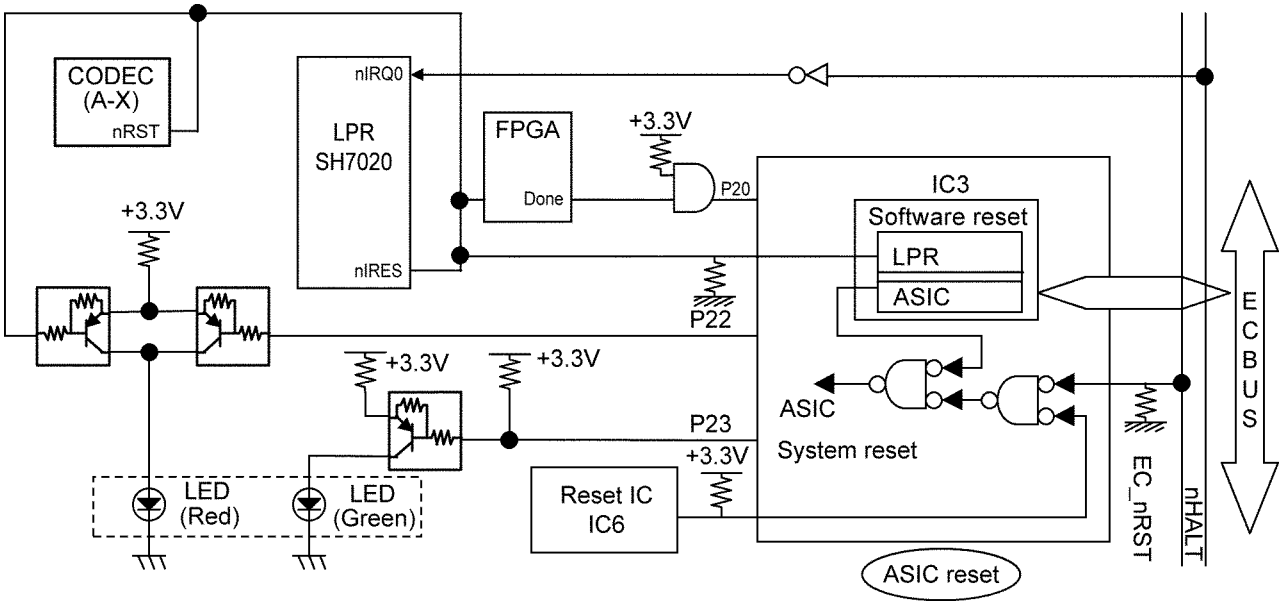
5.2.1.1. CPU Peripherals

- **CPU (System clock: 12.288 MHz).....IC601**
  Data bus: 16bit, Address bus: 23bit
- Flash ROM (512Kbyte).....IC602
  Flash memory consists of two areas: boot space and administration space.
  Administration program can be rewritten through downloading.

0	Sector 0 16KB	Boot (128KB)
4000	Sector 1 8KB	
6000	Sector 2 8KB	
8000	Sector 3 32KB	
10000	Sector 4 64KB	
20000	Sector 5 64KB	Administration (384KB)
30000	Sector 6 64KB	
40000	...	
70000	Sector 10 64KB	

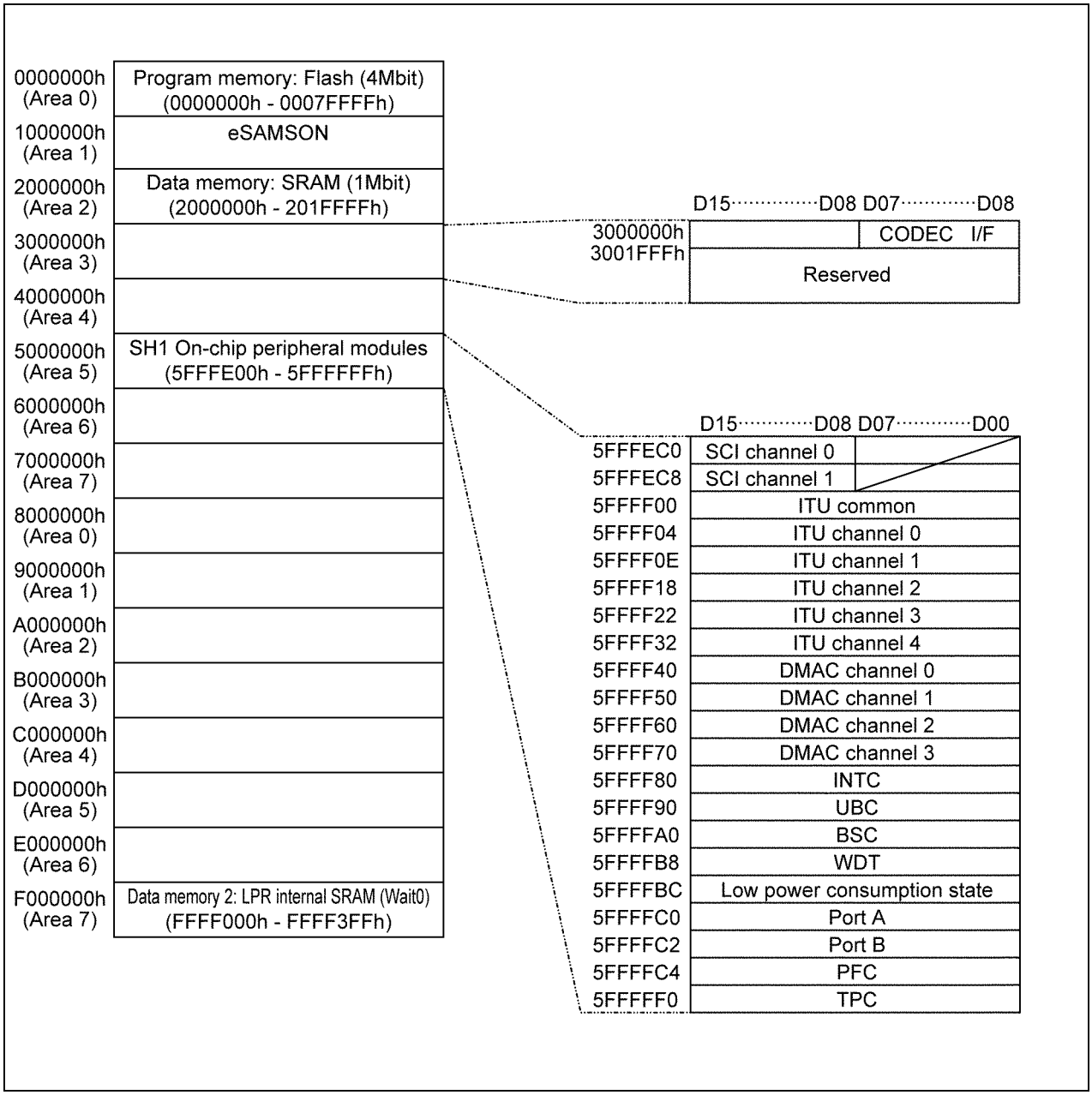
- **SRAM (1Mbit).....IC603**
  Used for the data buffer for CPU work area, and SLT communication.
- **Reset**
  Resets of an ECSLC24 card are roughly classified into the two kinds: ASIC reset and LPR reset.
  After the release of the ASIC reset, the LPR reset is released by the soft reset from the side of the main card and the LPR program is booted.
  For approx. 1 second after LPR reset until the Config reset signal (Done pin) in FPGA is cancelled, access to FPGA is restricted.First check configuration in FPGA is complete, then start accessing.

Type of reset	Reset method		Specification
ASIC reset	ASIC reset is reset under the AND condition of reset signals (negative logic) listed below.		
	Power-on reset	Reset by reset IC	
	Hard reset from the main bus	Reset by EC_RST signal	
	Soft reset from the main bus	Released after the specified time	
LPR reset	Soft reset from the main bus		Low active Reset pulse width: 1.6 microseconds or more

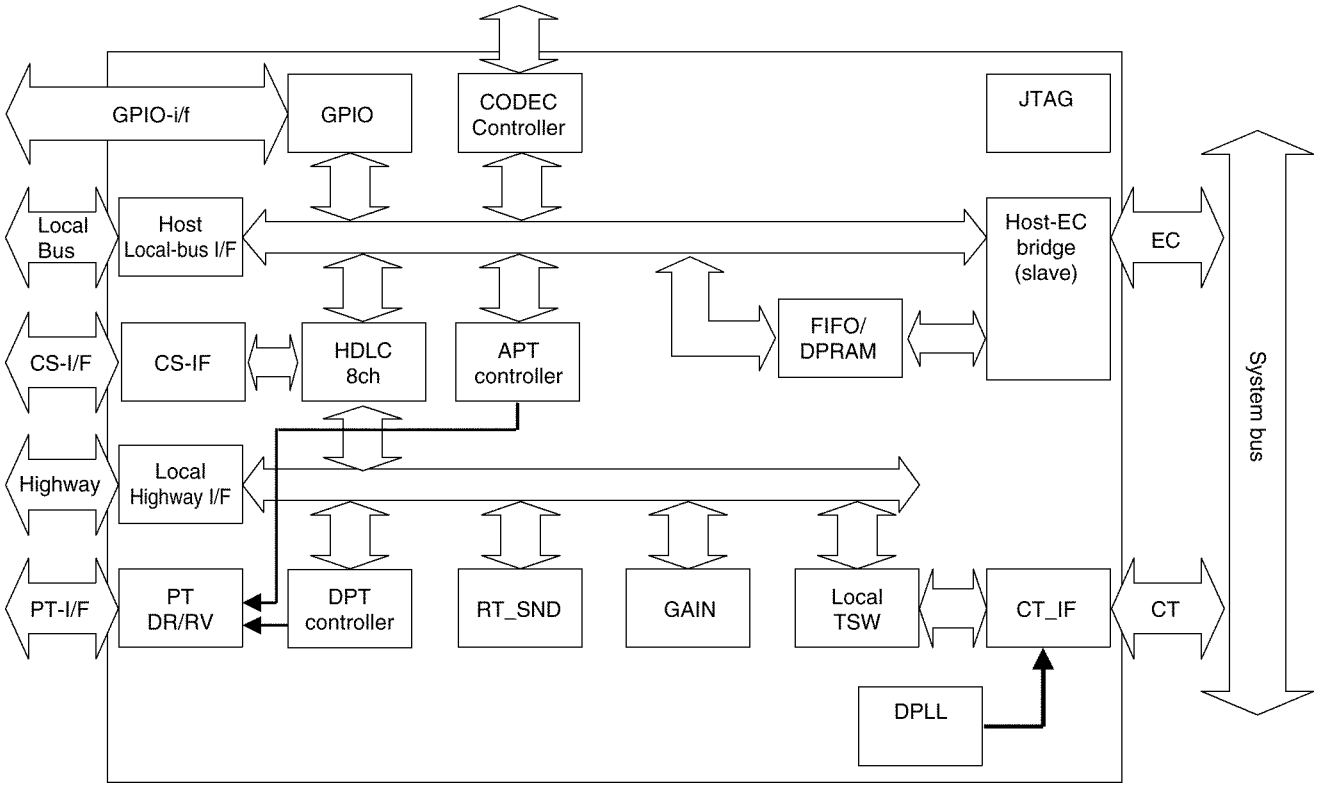


• **LED Operation status indicating LED (Two colors)**
OFF: Fault
Red ON: Fault (RESET included)
Green ON: Normal (Line not in use)
Green Flash (60/minute): Normal (Line in use)
Orange: OUS (Because OUS needs to be controlled by MPR, reset terminal and port control terminal are Red Blinking: OUS to generate OUS)

• Instantaneous power interruption operation
When instantaneous power interruption is 300msec or less, reset operation is not carried out because the voltage is retained by the capacitor in the power supply.
After HALT from MPR is detected at the DC power down port, CPU goes into the sleep mode by executing the instruction of SLEEP.
At the sleep mode, the CPU/Clock enters the halt state while the contents of the register, the internal RAM, and the I/O port are maintained.
When the instantaneous power interruption is released, HALT is negated, and CPU is recovered to the normal mode by the detection of IRQ0=L



5.2.2. IC3 (ASIC)



- **EC bus interface**
  Independent bus for 16bit/8MHz two-way address data multiplex.
- **CT bus interface**
  Supports eight 8.192MHz highways (128 time slots).
- **Local TSW**
  Exchanges the time slots between CT bus (1024ch) and local highway (64ch).
- **Local highway interface**
  Accommodates 2.048, 4.096, and 8.192MHz highways (Up to 64 time slots).

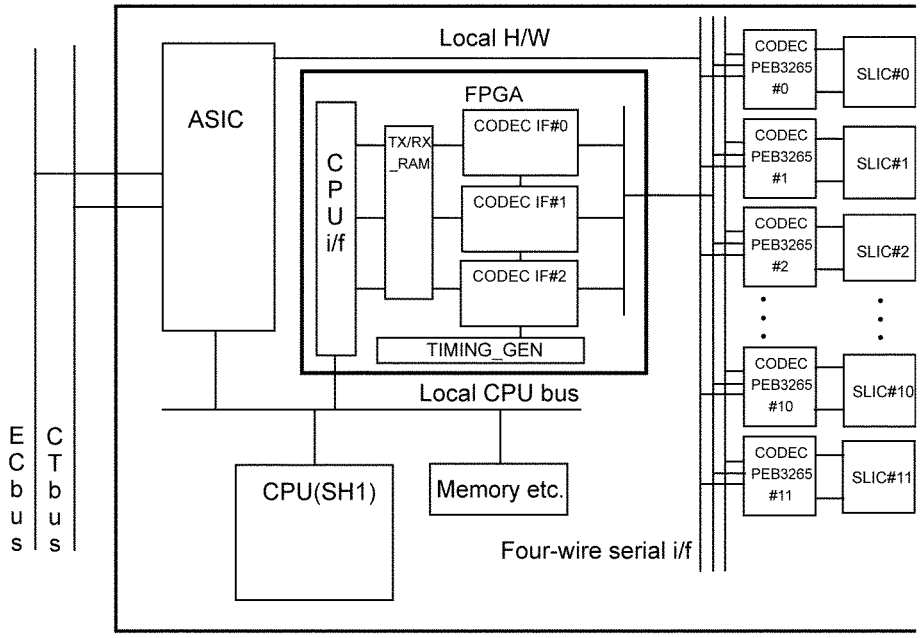
Slot	PCM data
0	SLT#0
1	SLT#1
2	SLT#2
3	SLT#3
4	SLT#4
5	SLT#5
6	SLT#6
7	SLT#7

Slot	PCM data
8	SLT#8
9	SLT#9
10	SLT#10
11	SLT#11
12	SLT#12
13	SLT#13
14	SLT#14
15	SLT#15
16	SLT#16
17	SLT#17
18	SLT#18
19	SLT#19
20	SLT#20
21	SLT#21
22	SLT#22
23	SLT#23
24~63	Not used

- **Local gain control**
  Controls the gain of the local highway up-and-down 64ch in 1db step arbitrarily.

• **CODEC interface**

Can connect up to 12 Infineon-manufactured PEB3265, and is intended for enabling the line control.

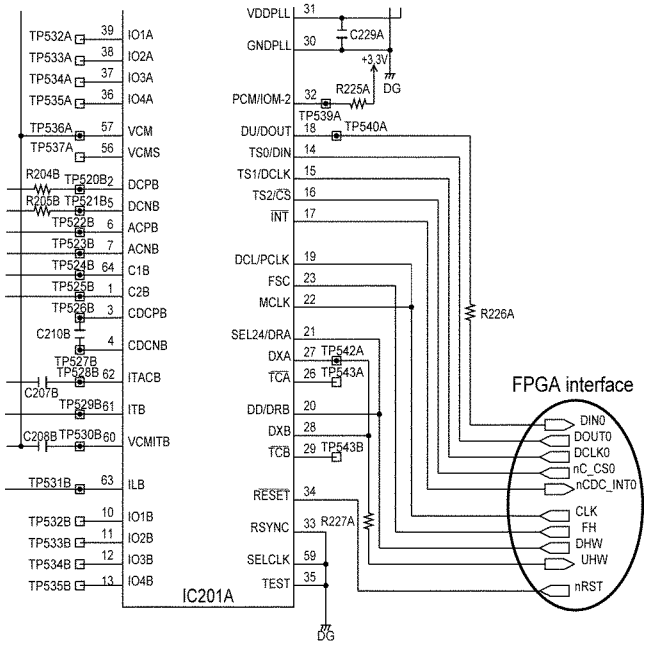


• **GPIO interface**

Parallel interface that is arbitrarily programmable bidirectionally.

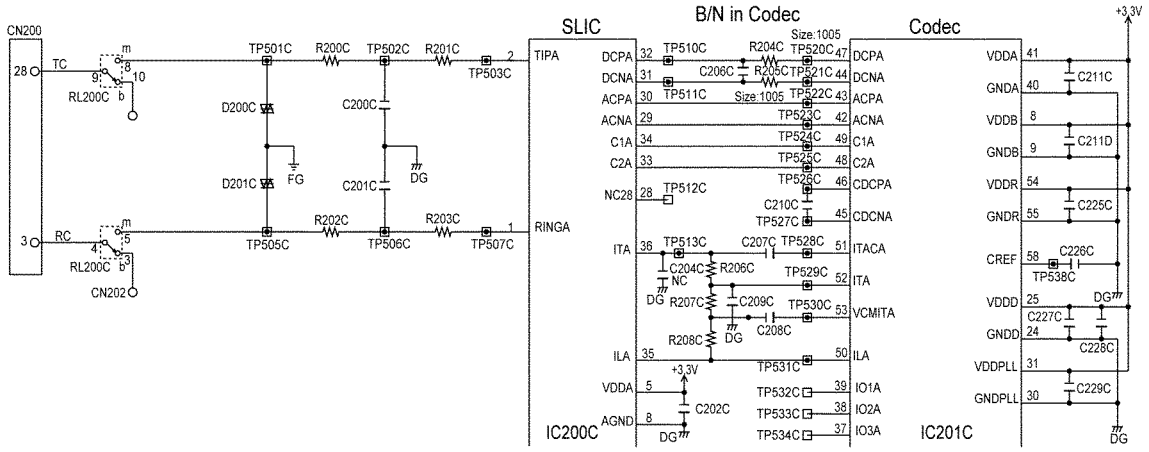
5.2.3. CODEC Function (IC201A-X)

Infineon PEB3265 CODEC is installed. The analogue features such as BN, frequency characteristic, volume level, sidetone are configured by FPGA CODEC interface DCLK, CS, DOUT, DIN. Also, it converts A/D to D/A, and 4-line-analogue signal to PCM code in G.711 format.



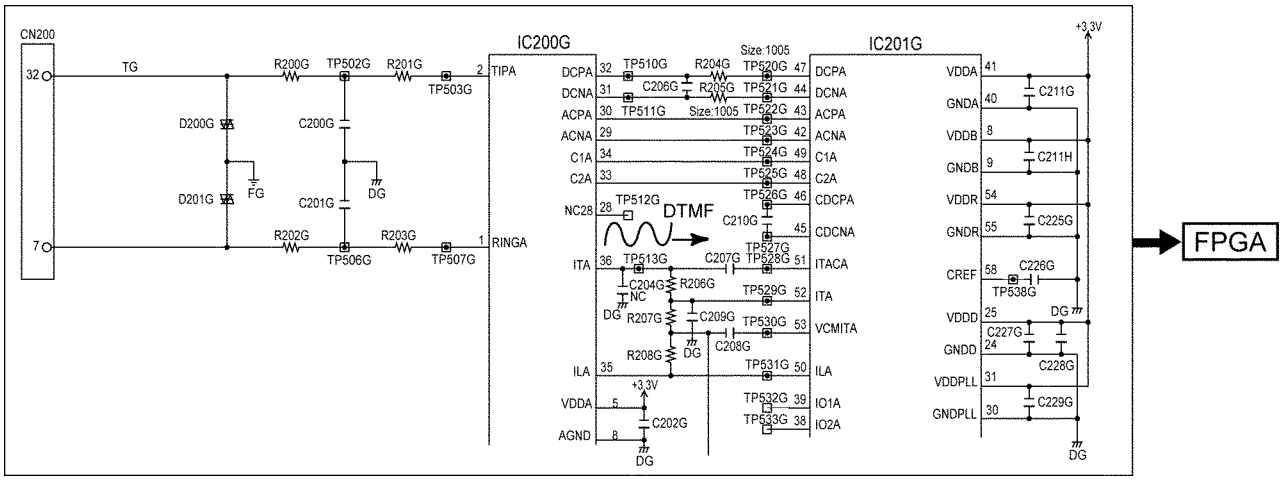
5.2.4. 2W-4W Conversion

It converts 4W-VOX signal used in the PBX to 2W-VOX signal used in SLT, and vice versa. It consists of an operational amplifier in the SLIC and a balanced network (B/N) in the CODEC. It can control the return loss of the audio data and frequency characteristics. By modifying the CODEC program, it can match the corresponding impedance.



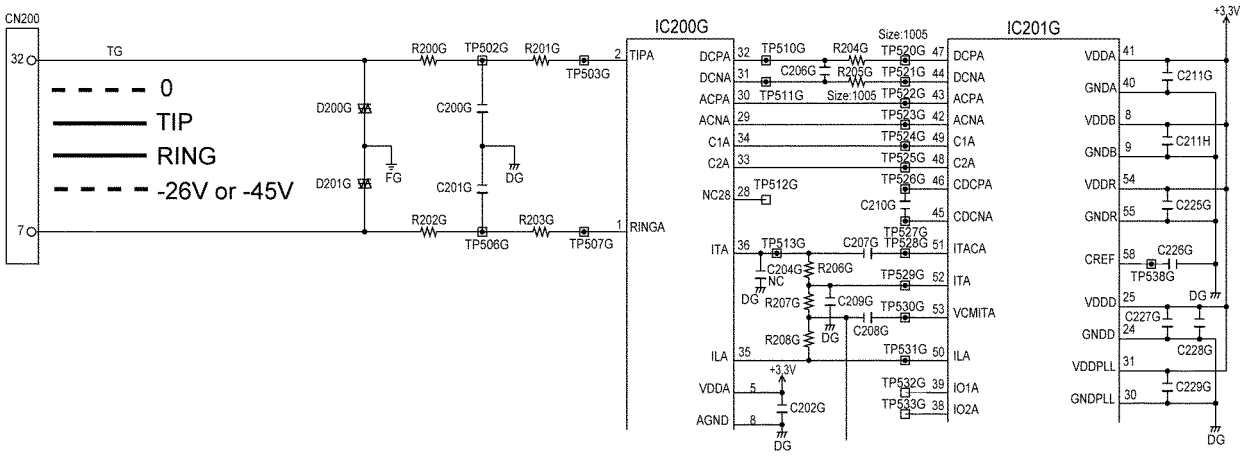
5.2.5. DTMF Signal Detection

Each port has its own DTMF receiver in the codec.
Detection of DTMF signal by Codec transmits this data to the MPR via the FPGA.
Via the FPGA, MPR reads the DTMF signal which is received in the Codec.



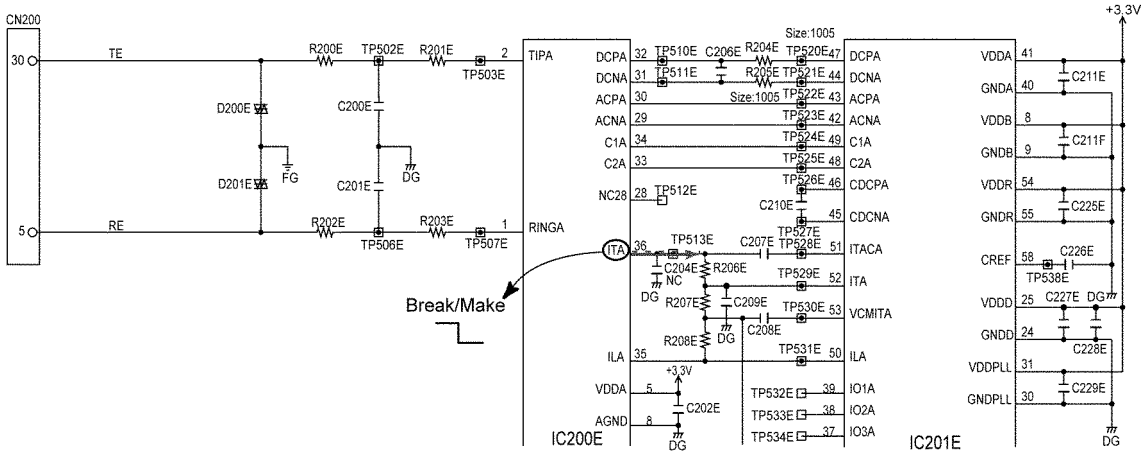
5.2.6. Power Supply

Voltage and current generated by the SLIC is supplied to the phones.
Preset voltage is -26V, but is switched over to -45V for ports 1-8, depending on circuit distance.
Current is set as 26mA.



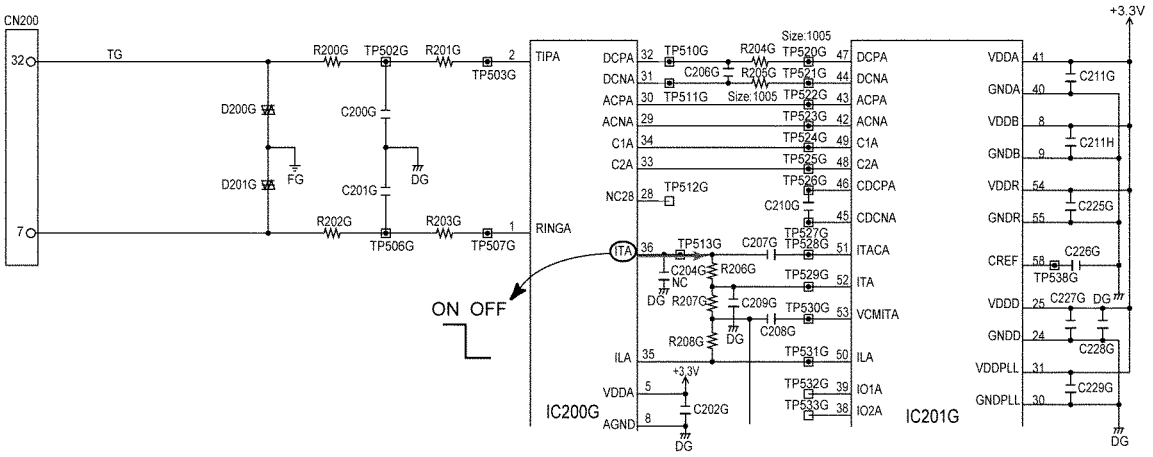
5.2.7. Dial Pulse Detection

When a telephone initiates pulse dialing, this feature detects the pulse-dialing signal.
When the telephone initiates dialing, changes in voltage is detected in SLIC, and this information is transmitted to the ITA/ITB pin of SLIC (27, 36pin) as Make=L/Break=H signal. This digital signal is received by CODEC IC and recognized as dialing signal. Both 10pps and 20pps can be received. The dialing speed is analyzed by software.



5.2.8. Hook Detection

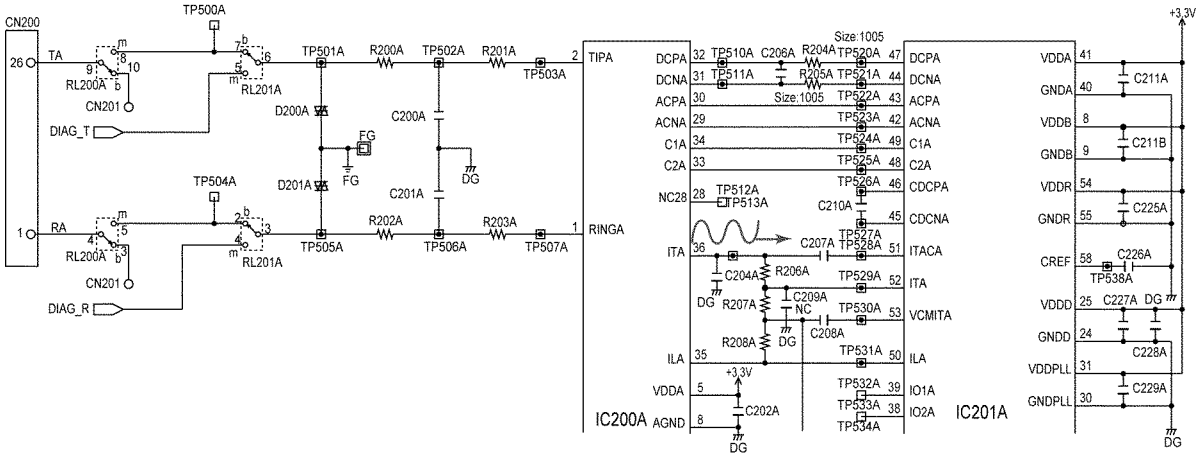
The off-hook status is detected when the telephone is off-hook. When a telephone is off-hook, change in current is detected in SLIC, and this information is transmitted to the ITA/B pin of SLIC (27, 36pin) as OFF-HOOK=L/ON HOOK=H signal. This digital signal is received by CODEC IC and recognized as off-hook signal. The off-hook status is analyzed by software.



5.2.9. Ring Trip Feature

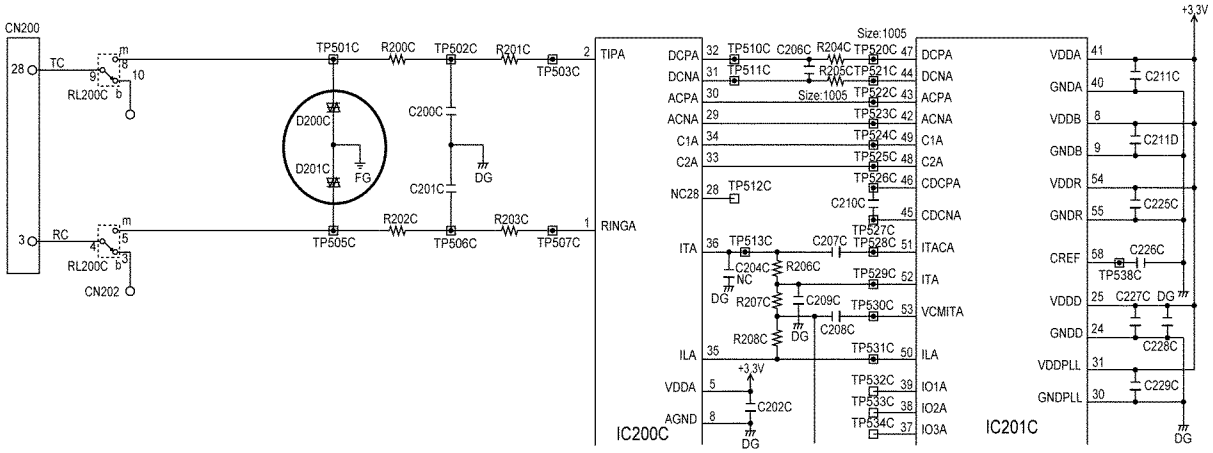
During ringing, the ring current is permanently sensed by the SLIC(IC200A-X). Signal of the ring current is supplied to the CODEC(IC201A-X) by means of the ITA/B signal.This current signal is continuously sampled by the CODEC.

When the handset of a ringing telephone is picked up, the current is compared against the programmed ring trip threshold. If it is above the programmed ring trip threshold, the ringing signal is automatically removed from the Tip-Ring interface during zero crossing.



5.2.10. Surge Protection

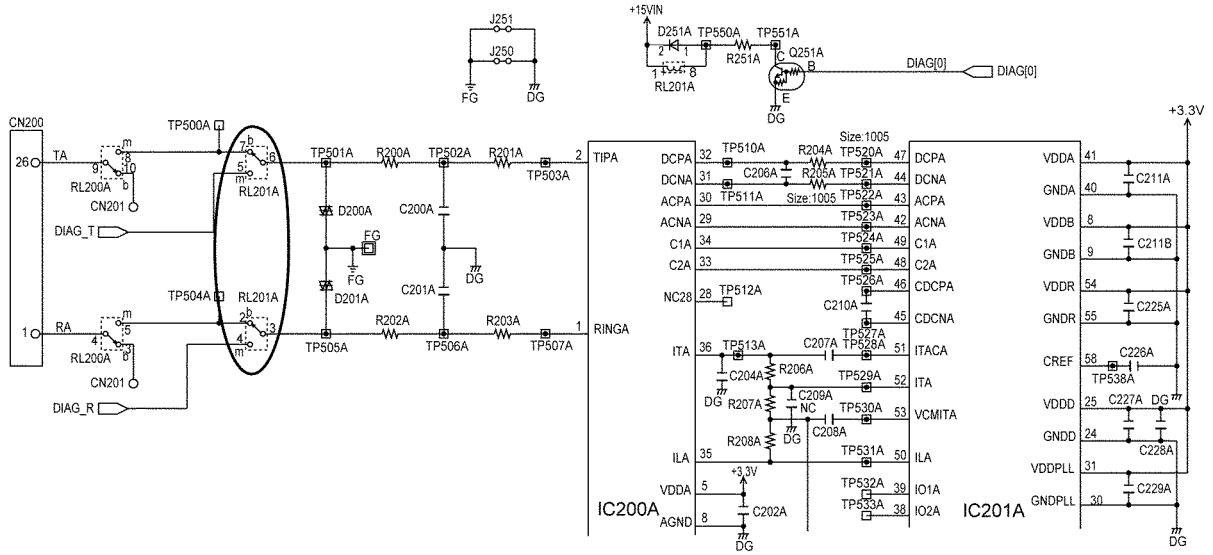
Thyristor is installed between T or R and FG protect from extraneous surge.



5.2.11. Self-Diagnosis

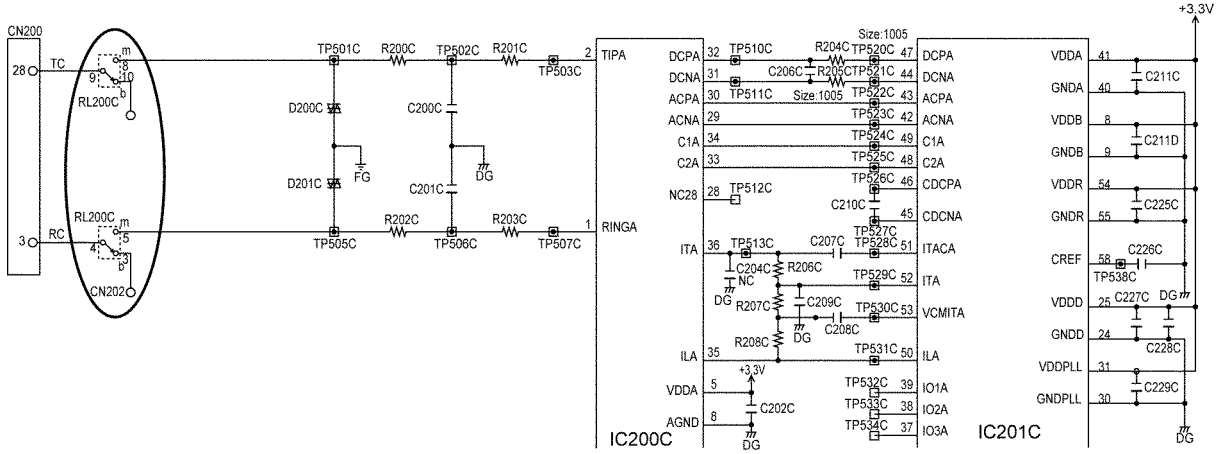
A self-diagnosis relay (RL201A) is installed in A port. In the normal operation mode, it breaks the self-diagnosis relay, and in the self-diagnosis mode, it makes the self-diagnosis relay. In the self-diagnostic mode, A Tip-Ring is connected to the paired Tip-Ring of the outside-line card via backboard, and self-diagnosis is feasible.

The self-diagnosis of the outside-line card includes outside call pick up, dial pulse transmission, DTMF transmission, BELL reception and CPC detection.



5.2.12. Power Failure Switch Feature

4 out of 24 lines have switching relays (RL200A-D) installed in order to enable the outside call during a power failure. The line connected to the outside call card will be directly connected to the CN201/202 located in forward part of the board via a 4-conductor TEL cord. In the normal operation mode, it breaks the power failure switching relay, and during a power failure, it makes the power failure switching relay to initiate Power failure direct connection mode.



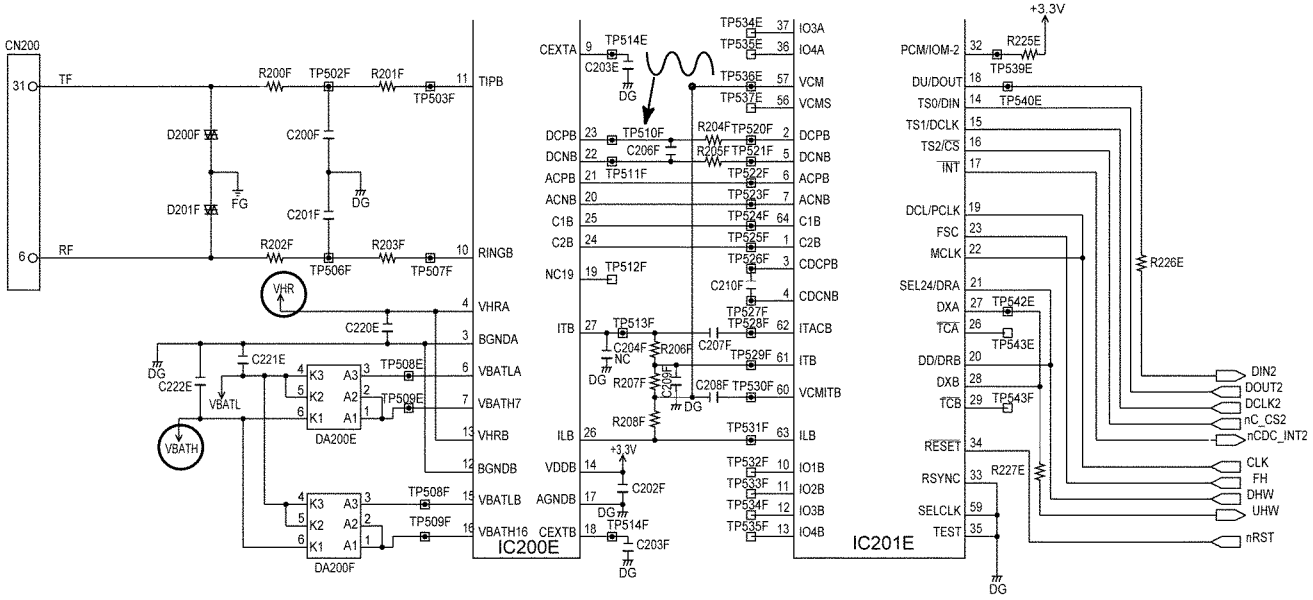
5.2.13. Bell Signal Generator and Transmission

In ringing mode, the ringing DC offset and the ringing signal are summed digitally within CODEC in accordance with the programmed values.

This signal is then converted to an analog signal and applies to the SLIC.

The SLIC amplifies the signal and supplies the line with 75 Vrms.

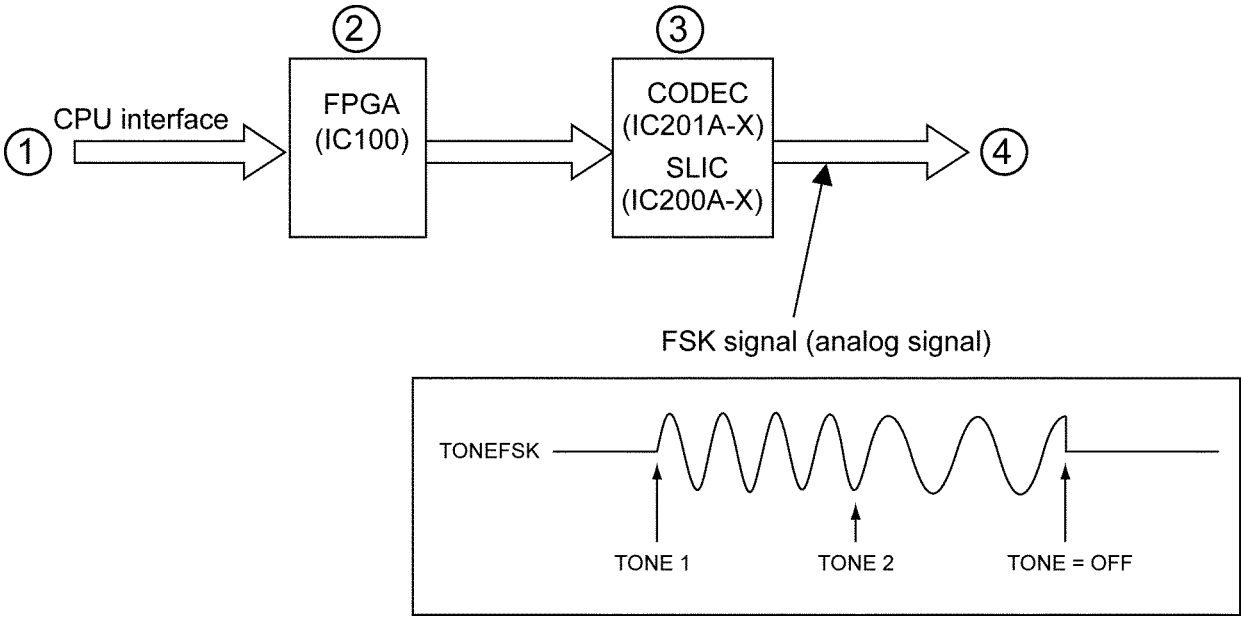
The bell signal is generated with +80V(VHR) and -55V(VBATH) supplied to SLIC.



5.2.14. EXT-CID Transmission

This Codec (IC201A-X) generates the extension Caller ID signals (FSK signal) with the CPU control.
The data flow is shown below.

1. The CPU control signals are received from EMPR.
2. FPGA (IC100) control FSK signal. Codec sends FSK signal via SLIC.
3. CODEC (IC201A-X) converts PCM signal to the analog signal.
4. Caller ID signals are sent to extension ports.

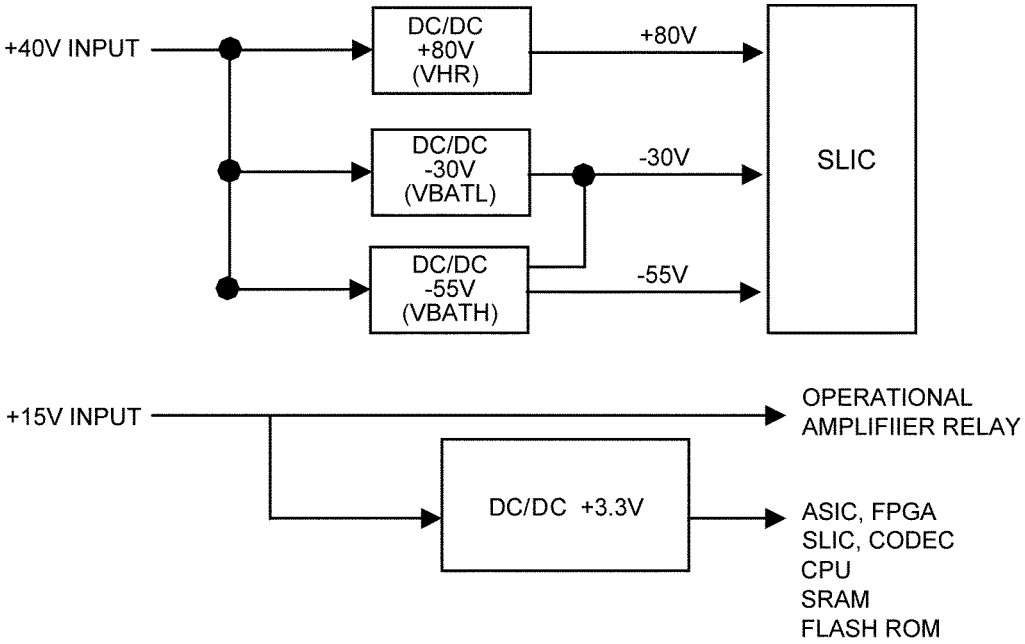


5.2.15. Power Supply Voltage Generator

• **Block Diagram**

The input from the main power supply is in 2 voltage levels: +15V, +40V.

Since the voltage levels: +15V, +3.3V, +80V, -30V and -55V are required onboard, voltage levels are generated onboard as written below.

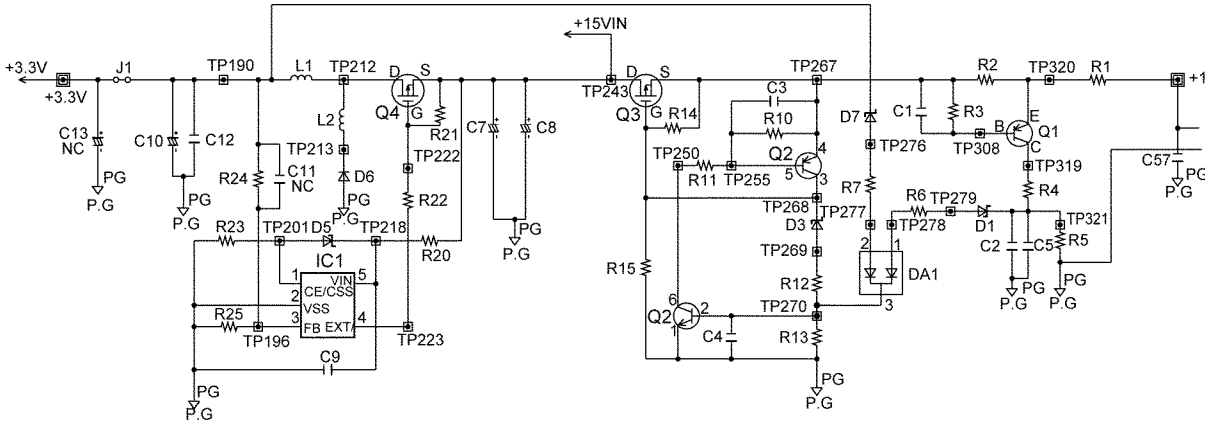


• **Protection of 3.3V output**

The protection circuit consists of an output short protection and an overvoltage protection.

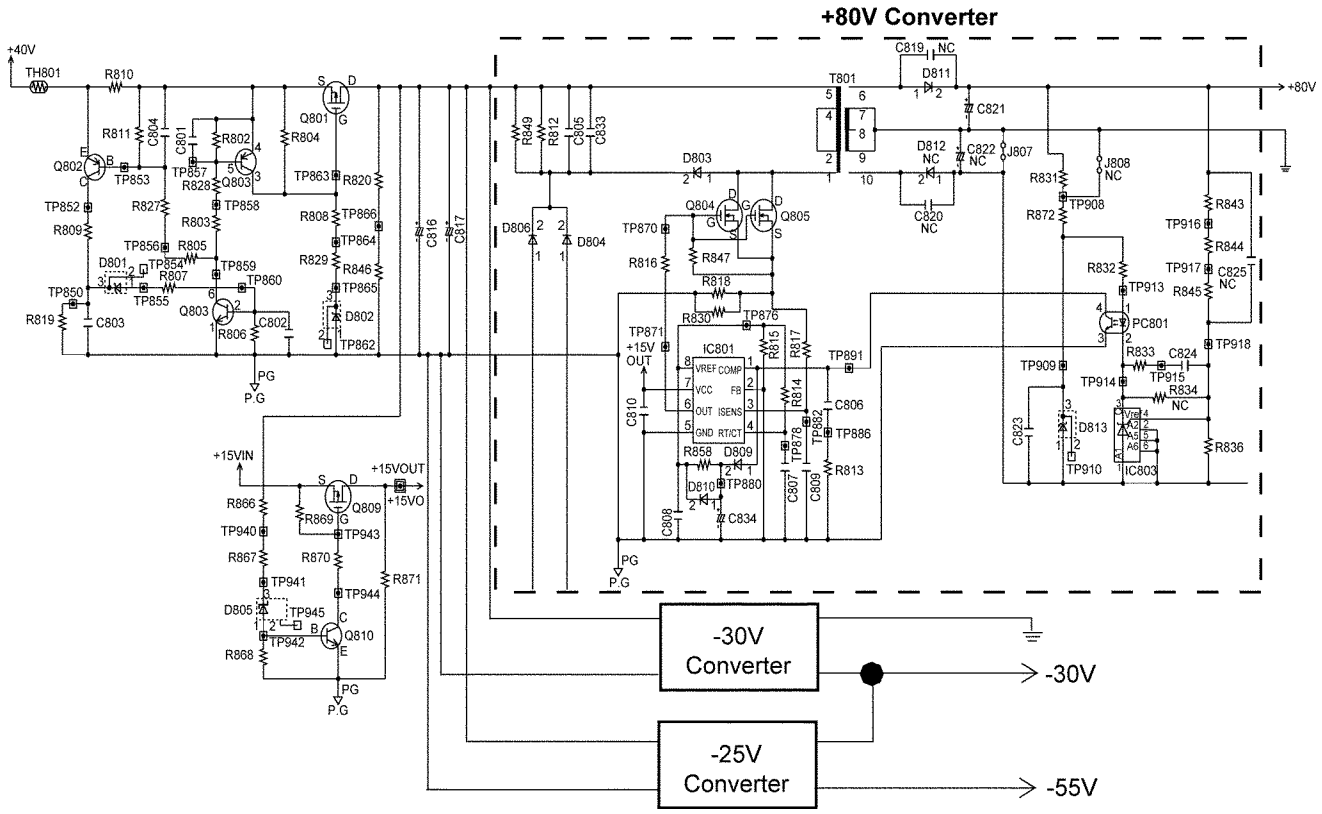
When an output of power supply is short, IC1 works to stop the output as the output short protection.

When +3.3V output become overvoltage caused by Q4 short, it is detected by D7. Q3 is cut by Q2 to shut down the input power supply as the overvoltage protection.



- **+80V/-30V/-55V Converter**

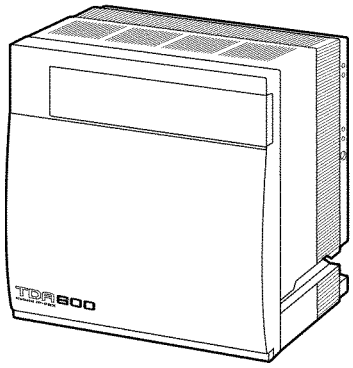
For +40V input power supply, Q801 is switched ON with input voltage of 22V to start up input power supply. Q809 is switched ON with input voltage of 28V to supply 15V to control circuits in all converters. Then all converters start up. Circuit configuration of -30V/-25V converter is same as +80V. In event of an over current in the 40V input line, due to a short circuit in the MOSFET Q804/Q805 switches, Q801 is cut off and the input power supply is shut down.



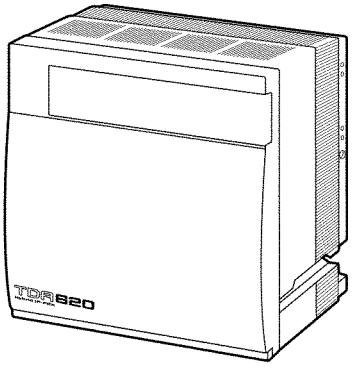
6 Location of Controls and Components

6.1. Names and Locations

Overview

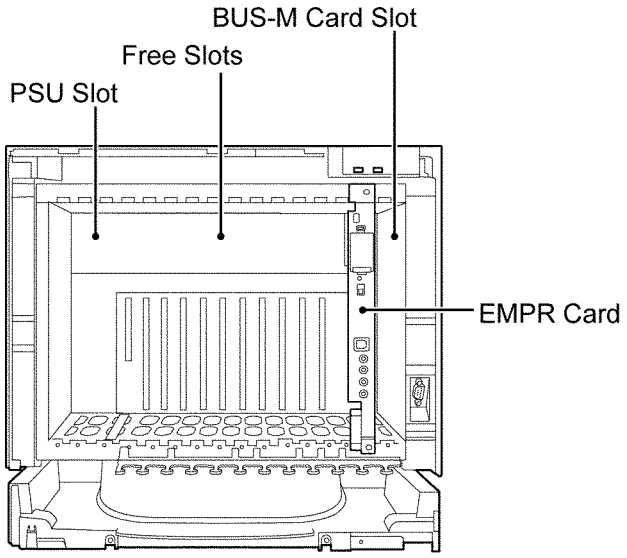


Basic Shelf
(KX-TDA600)

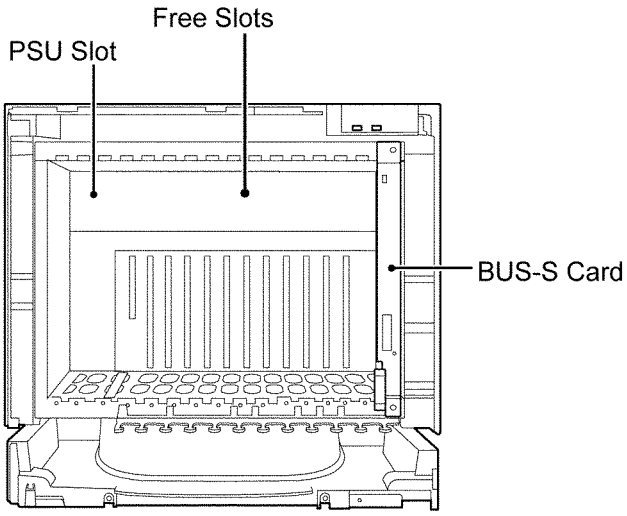


Expansion Shelf
(KX-TDA620)

Inside View



Basic Shelf
(KX-TDA600)



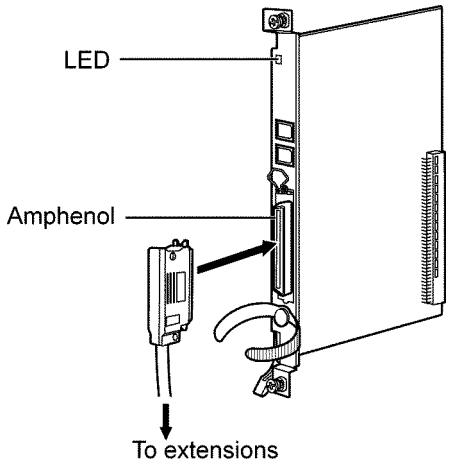
Expansion Shelf
(KX-TDA620)

7 Installation Instructions

7.1. ECSLC24 Card

Function

ECSLC24: 24-port extension card for SLTs with Caller ID (FSK) and 4 power failure transfer (PFT) ports.



Accessory and User-supplied Items

Accessories (included): Screws x 2, Ferrite core x 1

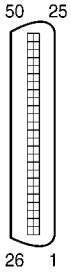
User-supplied (not included): Amphenol connector

Note:

- To connect the Amphenol connector, refer to “7.2. Fastening Amphenol Connector".
- For details about power failure transfer, refer to "7.3. Power Failure Connections".

Pin Assignments

Amphenol Connector



No.	Signal Name	Function	No.	Signal Name	Function
1	RA	Ring port 1	26	TA	Tip port 1
2	RB	Ring port 2	27	TB	Tip port 2
3	RC	Ring port 3	28	TC	Tip port 3
4	RD	Ring port 4	29	TD	Tip port 4
5	RE	Ring port 5	30	TE	Tip port 5
6	RF	Ring port 6	31	TF	Tip port 6
7	RG	Ring port 7	32	TG	Tip port 7
8	RH	Ring port 8	33	TH	Tip port 8
9	RI	Ring port 9	34	TI	Tip port 9
10	RJ	Ring port 10	35	TJ	Tip port 10
11	RK	Ring port 11	36	TK	Tip port 11
12	RL	Ring port 12	37	TL	Tip port 12
13	RM	Ring port 13	38	TM	Tip port 13
14	RN	Ring port 14	39	TN	Tip port 14
15	RO	Ring port 15	40	TO	Tip port 15
16	RP	Ring port 16	41	TP	Tip port 16
17	RQ	Ring port 17	42	TQ	Tip port 17
18	RR	Ring port 18	43	TR	Tip port 18
19	RS	Ring port 19	44	TS	Tip port 19
20	RT	Ring port 20	45	TT	Tip port 20
21	RU	Ring port 21	46	TU	Tip port 21
22	RV	Ring port 22	47	TV	Tip port 22
23	RW	Ring port 23	48	TW	Tip port 23
24	RX	Ring port 24	49	TX	Tip port 24
25	Reserved	-	50	Reserved	-

LED Indications

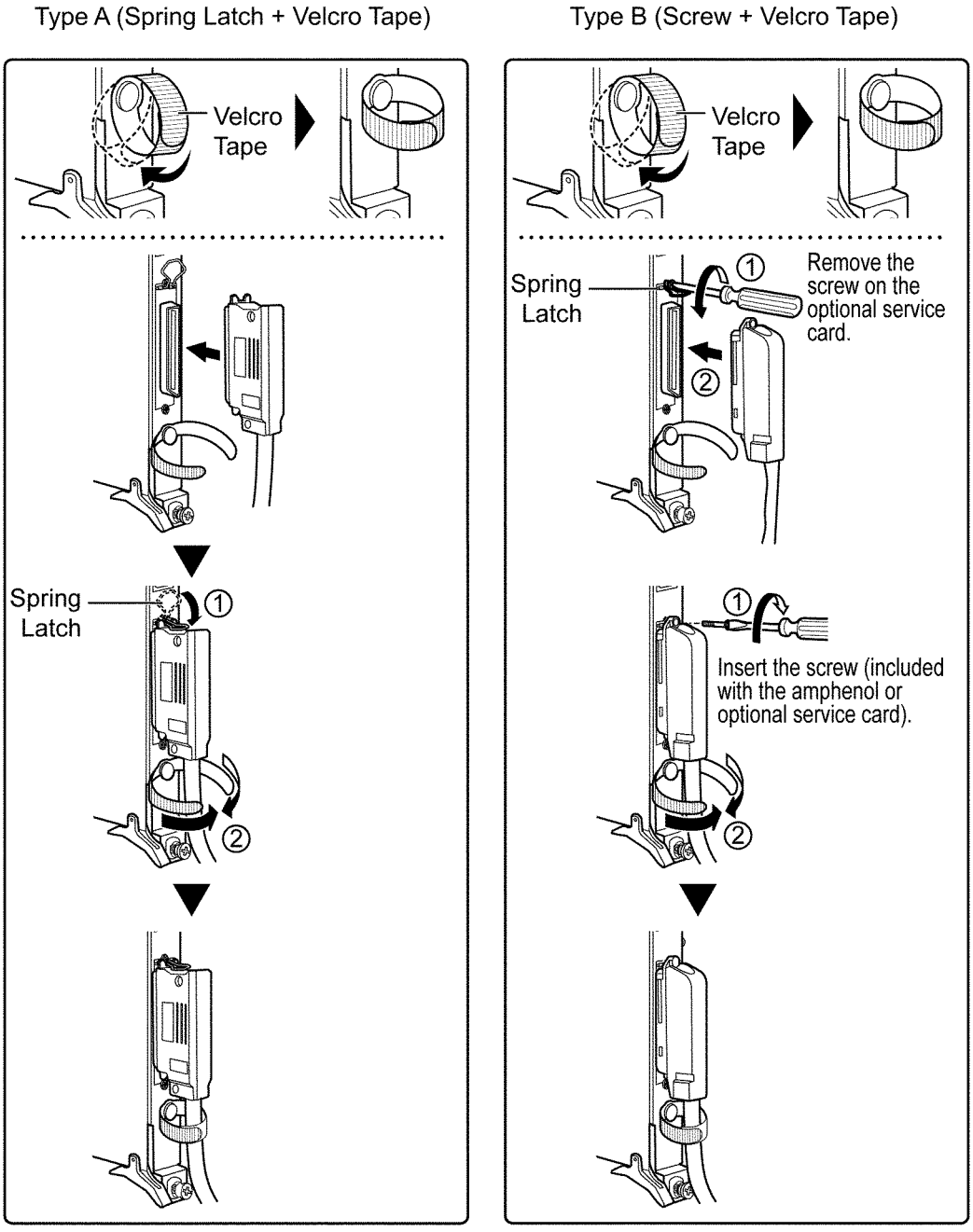
Indication	Color	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

7.2. Fastening Amphenol Connector

Fastening Amphenol Connector

An amphenol 57JE type connector is used on some of the optional service cards.

To connect an amphenol connector, use the spring latch or screw to fix the upper part and use Velcro® tape to fix the lower part of the connector.



7.3. Power Failure Connections

Note:

While DC power is provided by the backup batteries, the Hybrid IP-PBX will remain fully operational and the connection will not switch to the Power Failure Connection.

Using Analogue Trunk Card and Extension Card

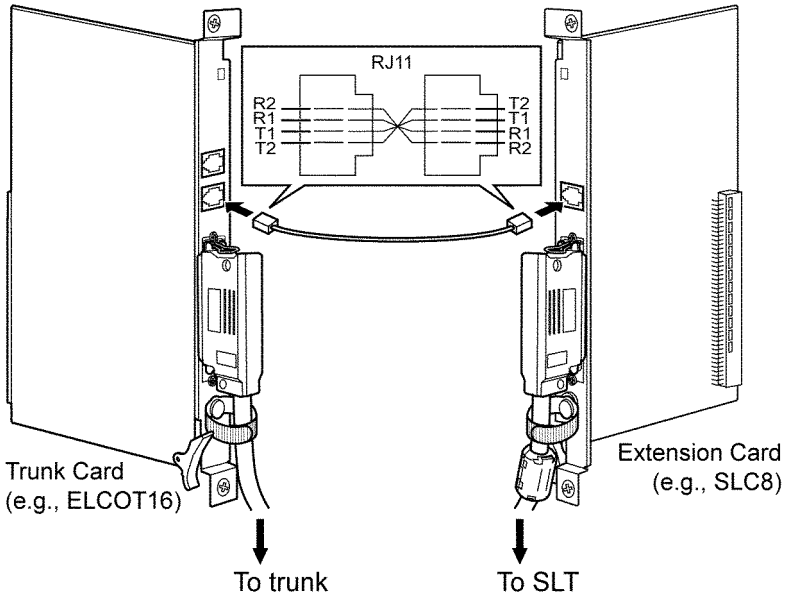
Power Failure Connection connects a specific SLT and a trunk in the event of power failure. The following analogue trunk and extension cards can be used for Power Failure Connections:

- Analogue trunk card: LCOT16 (4 PFT ports), LCOT8 (2 PFT ports)
- Extension card: MSLC16 (4 PFT ports), SLC16 (4 PFT ports), CSLC16 (4 PFT ports), ECSLC24 (4 PFT ports), DHLC8 (2 PFT port) and SLC8 (2 PFT port)

To 1 analogue trunk card, connect only 1 extension card.

Note:

- By programming the Hybrid IP-PBX, a trunk conversation established during power failure can be maintained even when the power returns and the connection is switched back to the normal maintained even when the power returns and the connection is switched back to the normal performed, the connection will be dropped when power returns.



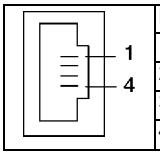
Accessories and User-supplied Items

Accessories (included): none

User-supplied (not included): RJ11 connectors

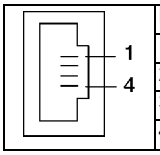
RJ11 Connector Pin Assignments for Analogue Trunk Card

PFT Ports 1 and 2



No.	Signal Name	Function
1	R2	Ring port 2
2	R1	Ring port 1
3	T1	Tip port 1
4	T2	Tip port 2

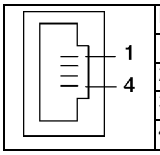
PFT Ports 3 and 4



No.	Signal Name	Function
1	R4	Ring port 4
2	R3	Ring port 3
3	T3	Tip port 3
4	T4	Tip port 4

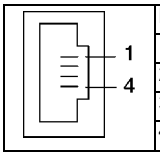
RJ11 Connector Pin Assignments for Extension Card

PFT Ports 1 and 2



No.	Signal Name	Function
1	T2	Tip port 2
2	T1	Tip port 1
3	R1	Ring port 1
4	R2	Ring port 2

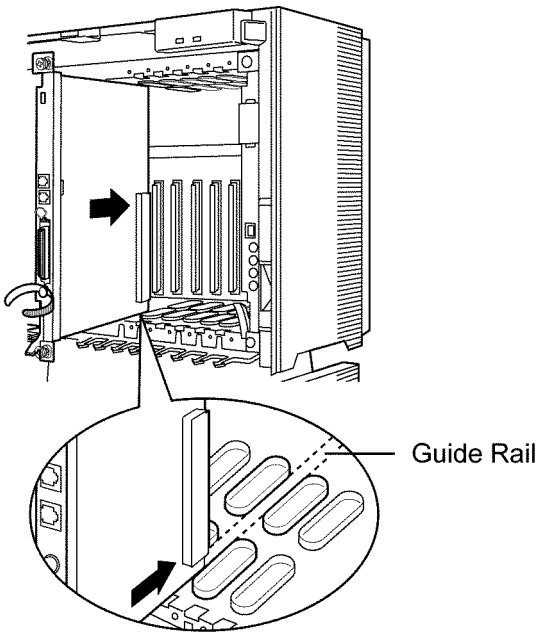
PFT Ports 3 and 4 (for MSLC16/CSLC16/SLC16/ECSLC24 card only)



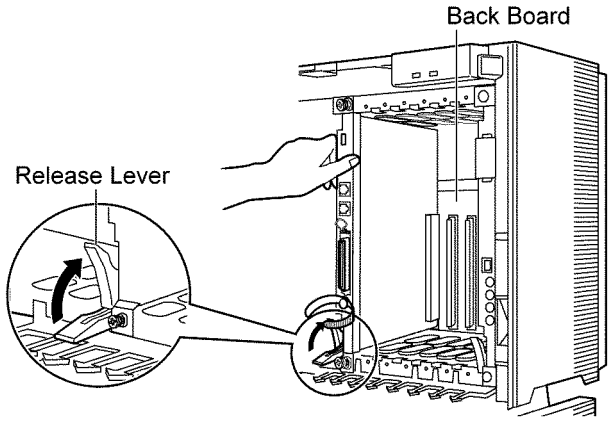
No.	Signal Name	Function
1	T4	Tip port 4
2	T3	Tip port 3
3	R3	Ring port 3
4	R4	Ring port 4

Installing Optional Service Cards

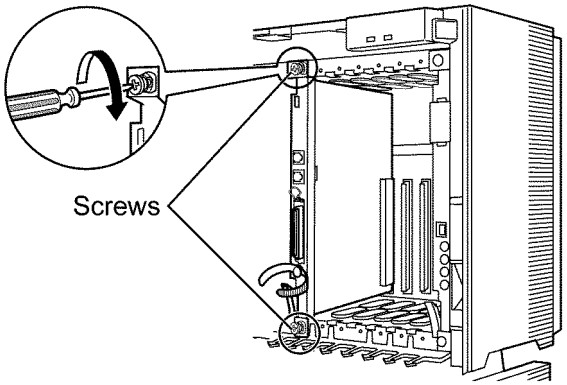
1. Insert the card along the guide rails.



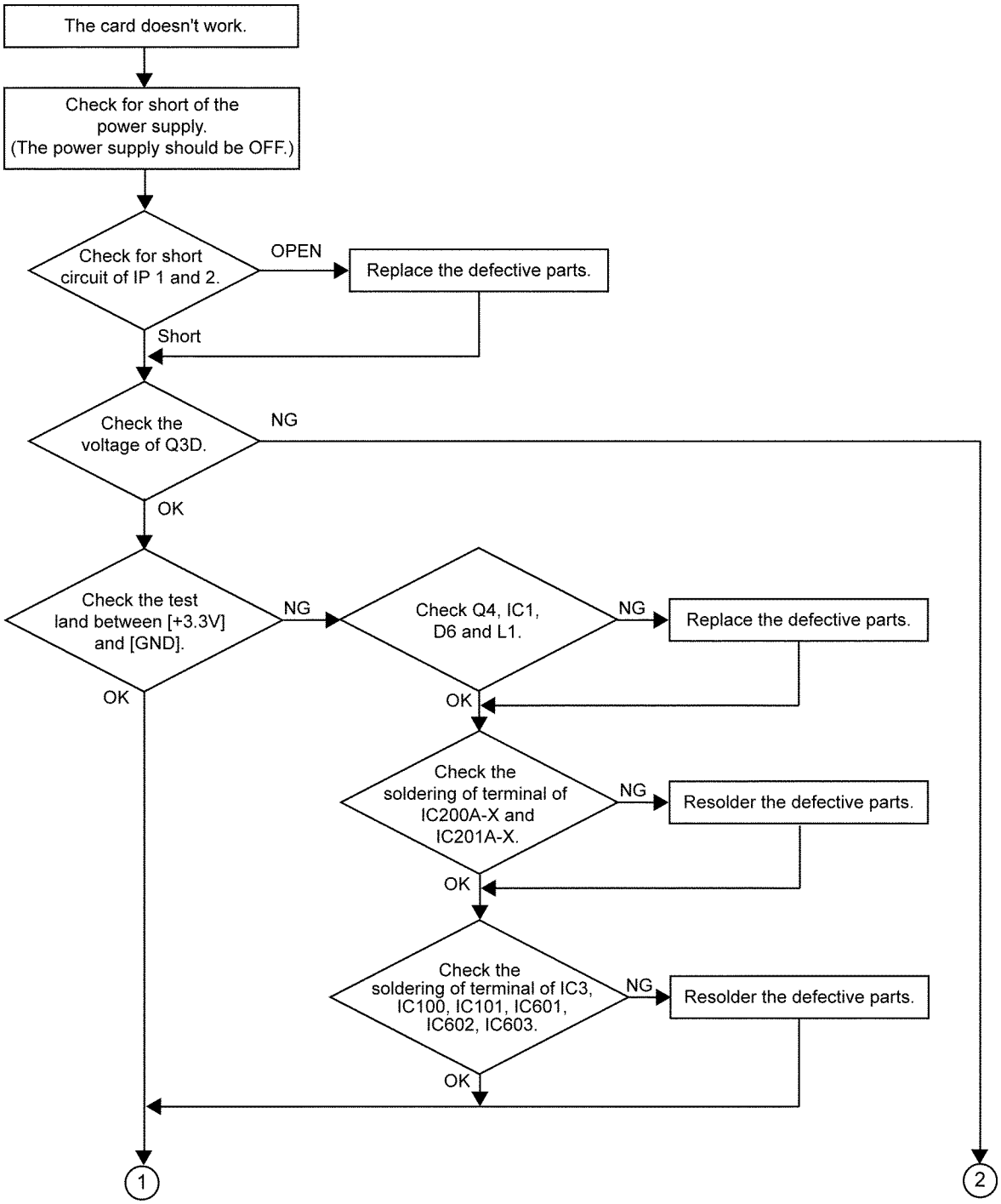
2. Holding the card as follows, push the release lever in the direction of the arrow so that the card is made to engage with the connector on the back board securely.

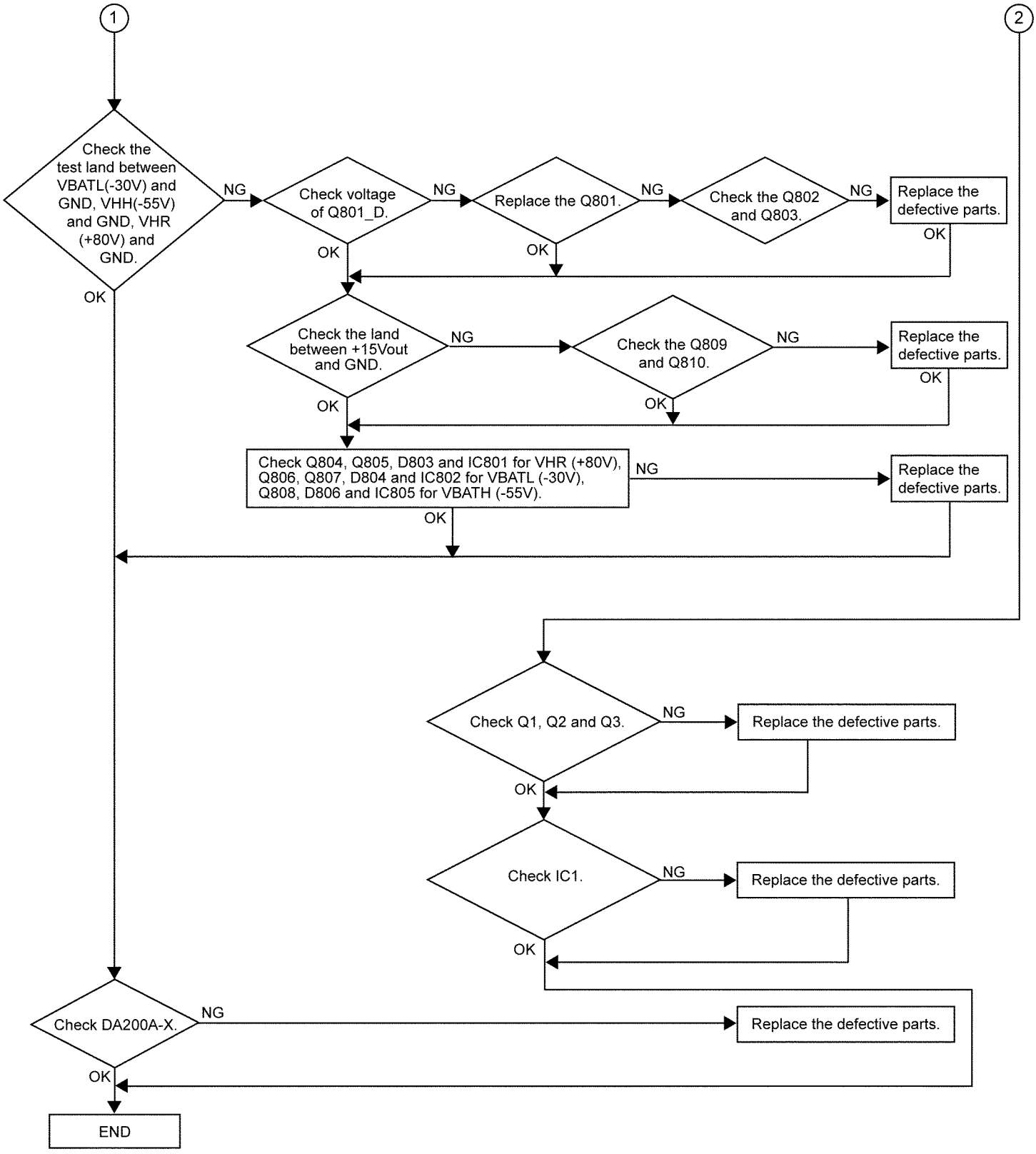


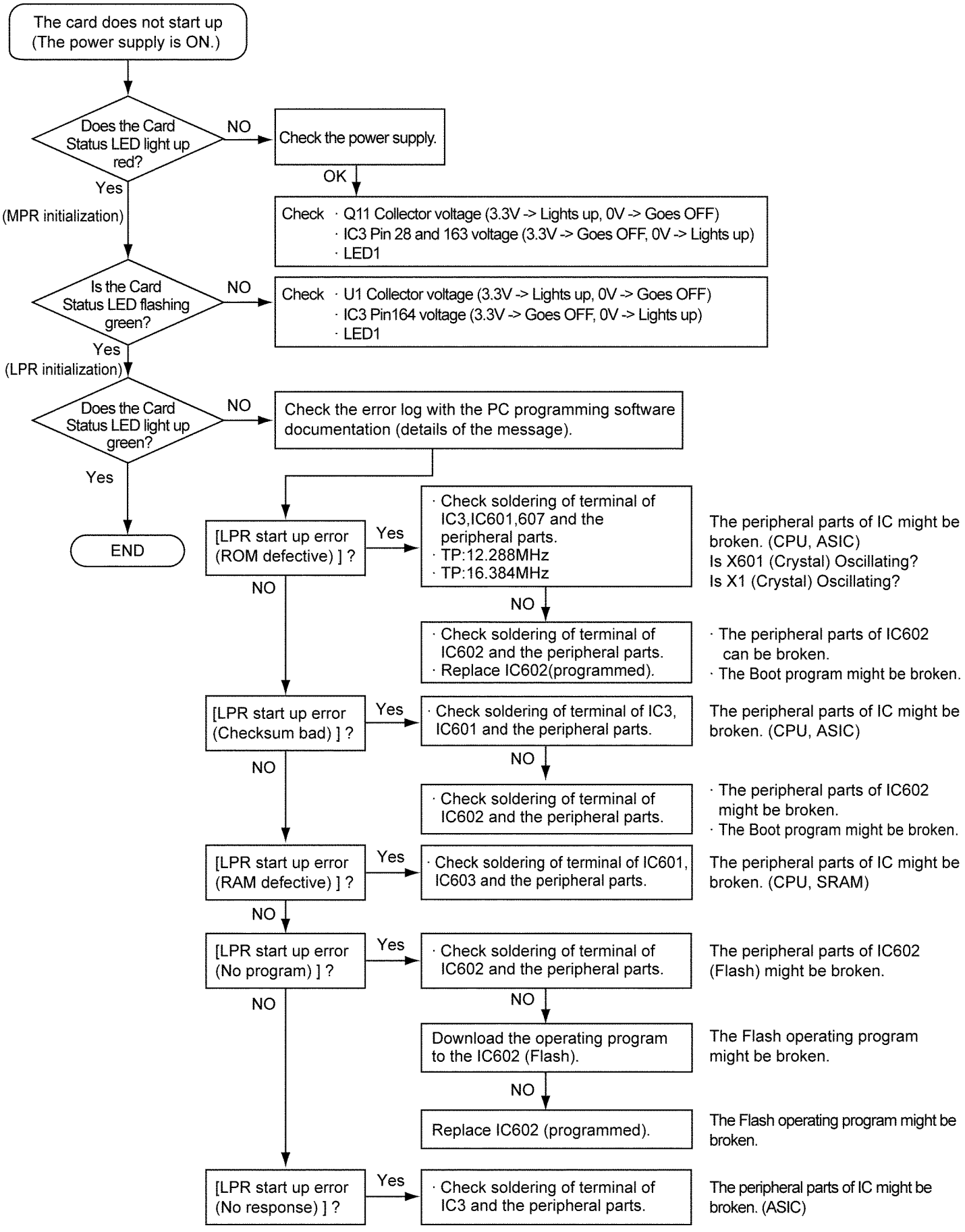
3. Turn the 2 screws clockwise to fix the card.

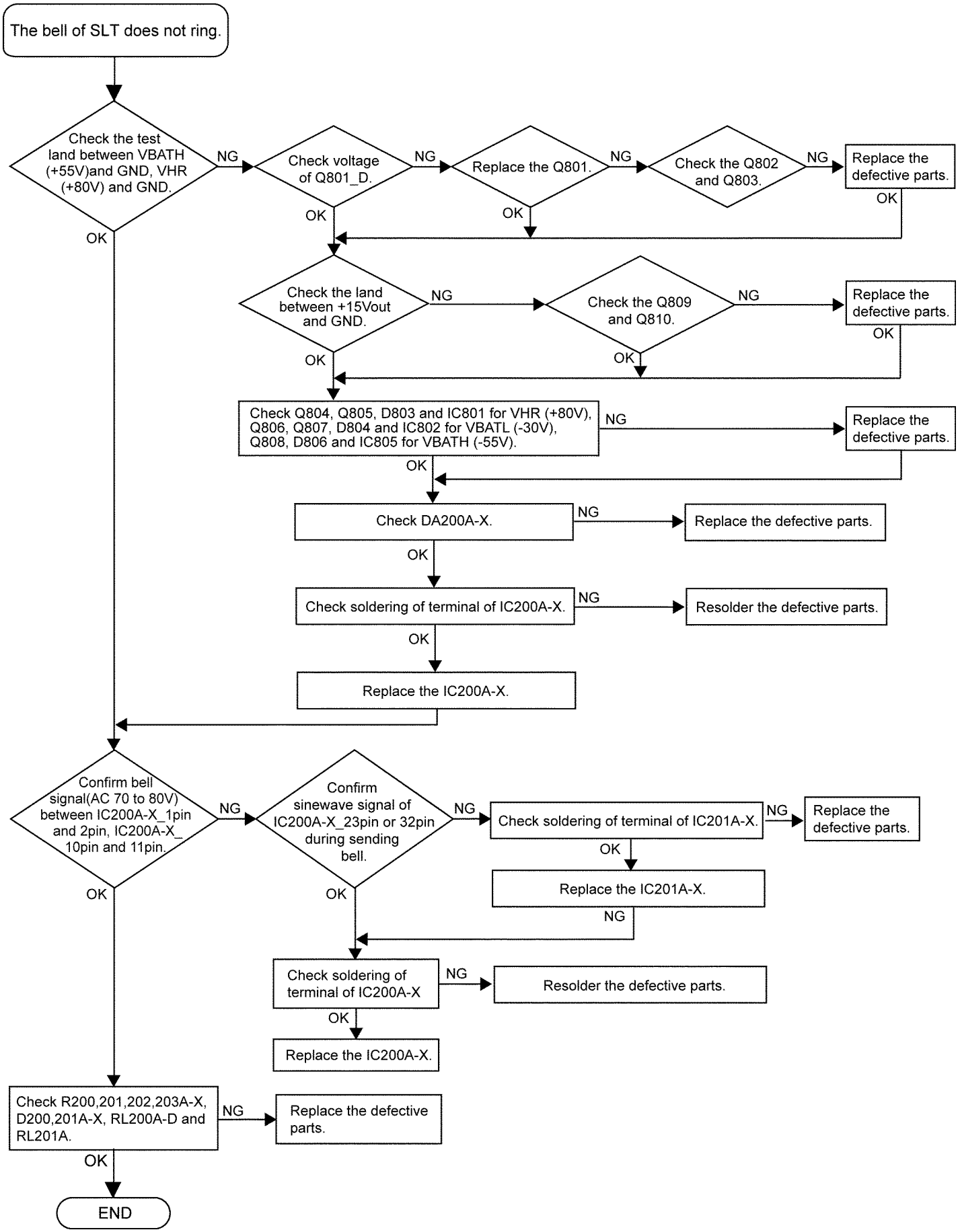


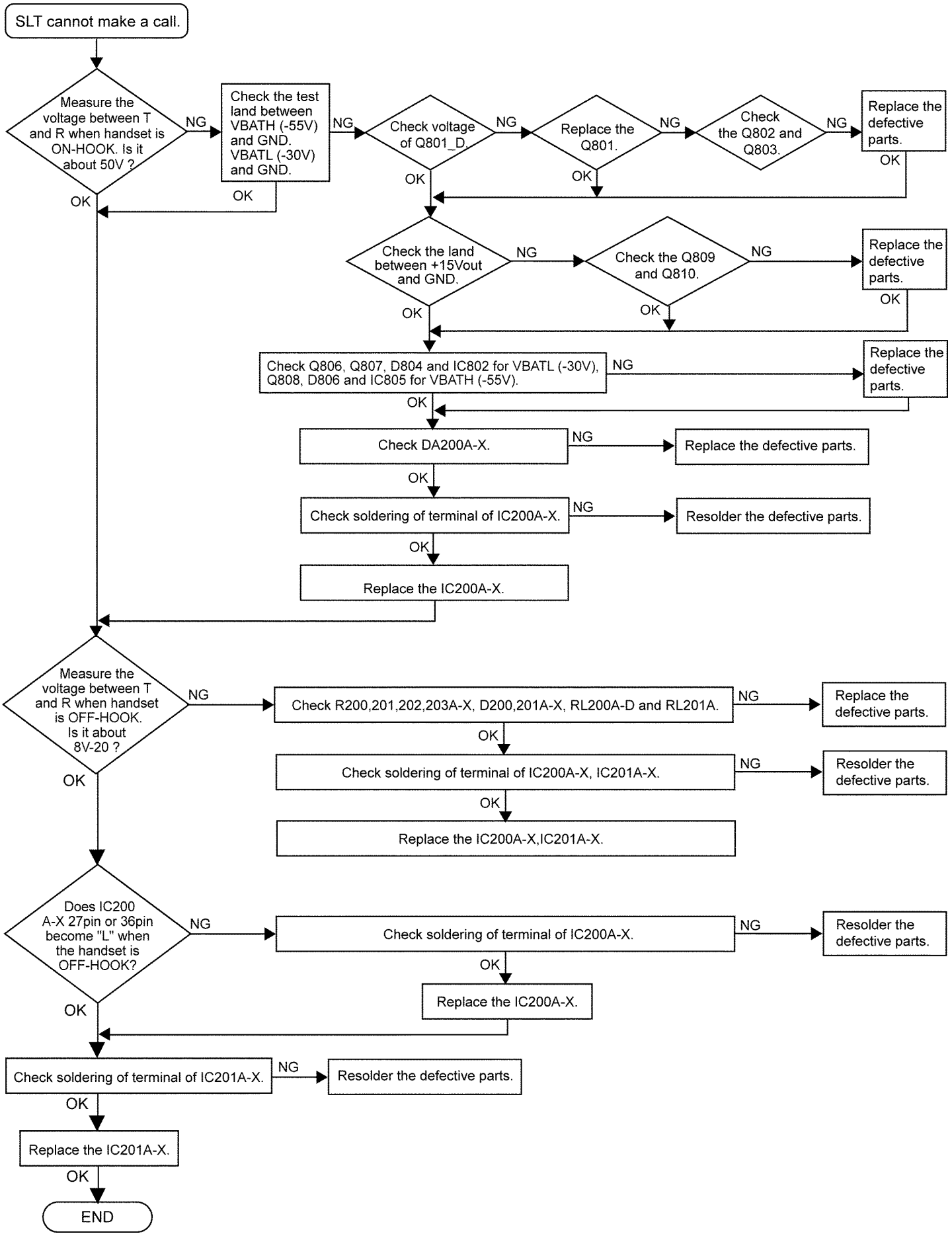
8 Troubleshooting Guide

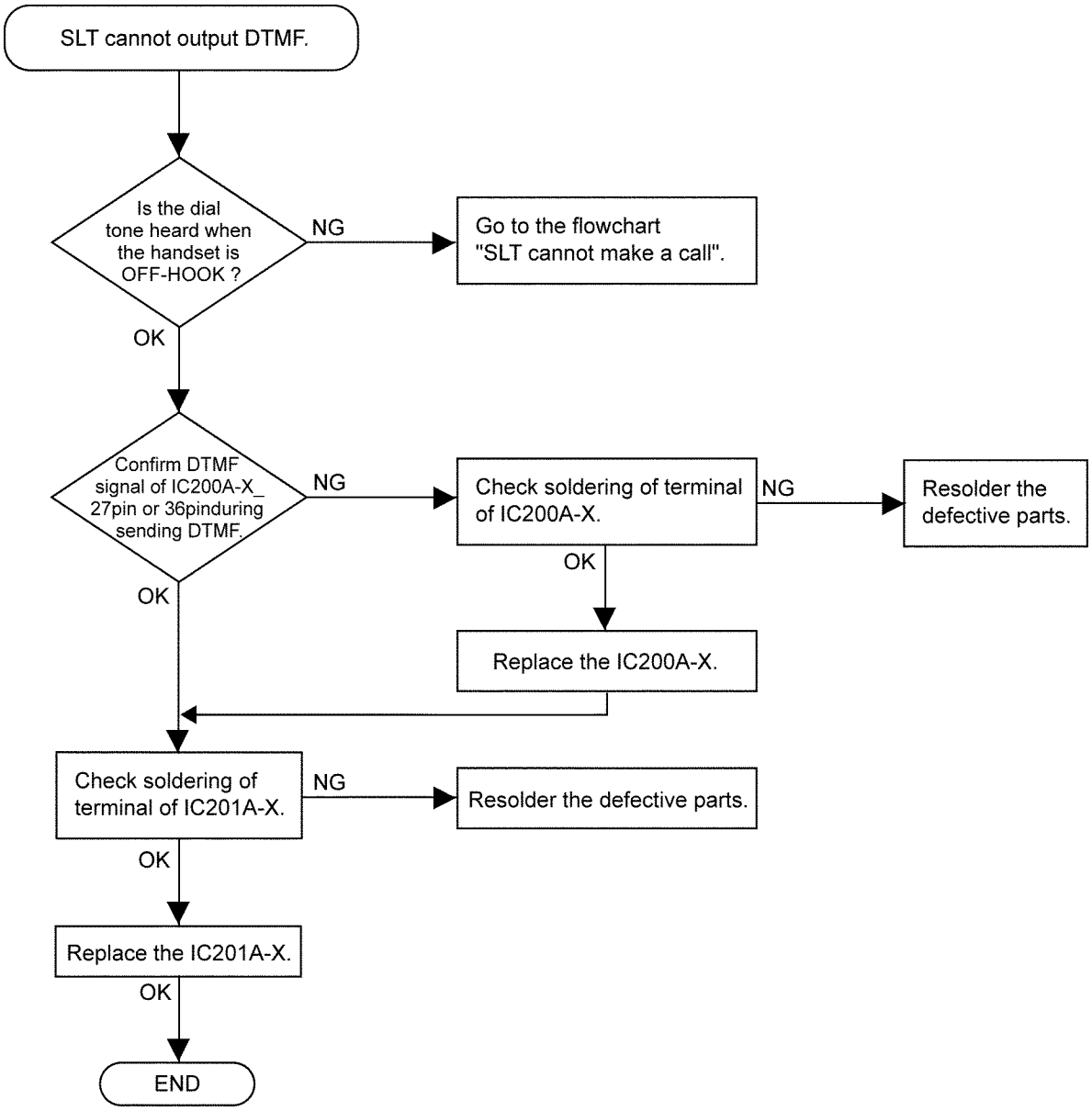


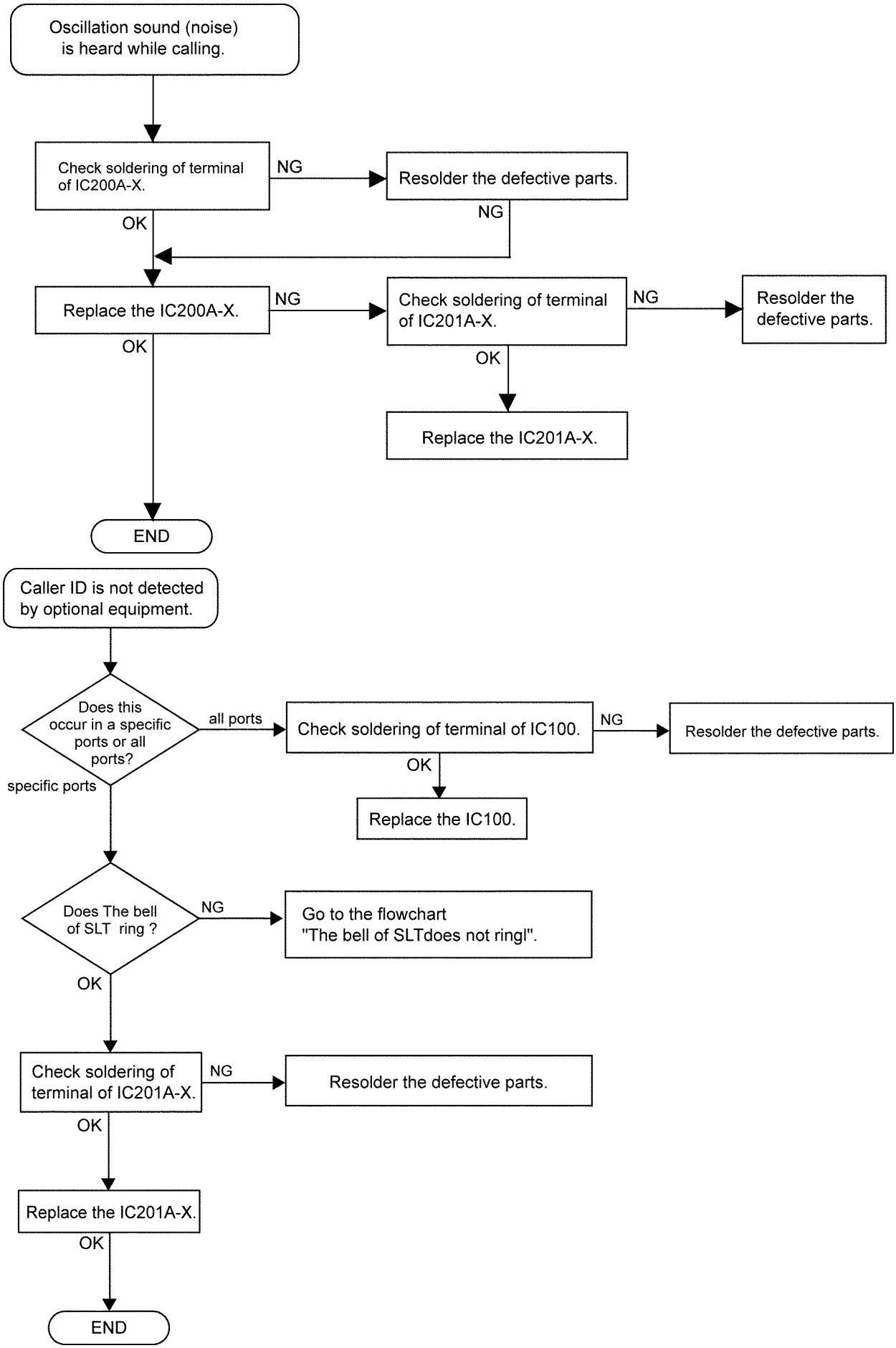

1
2
Check the test land between VBATL(-30V) and GND, VHH(-55V) and GND, VHR (+80V) and GND.
NG
Check voltage of Q801_D.
NG
Replace the Q801.
NG
Check the Q802 and Q803.
NG
Replace the defective parts.
OK
OK
OK
OK
Check the land between +15Vout and GND.
NG
Check the Q809 and Q810.
NG
Replace the defective parts.
OK
OK
OK
Check Q804, Q805, D803 and IC801 for VHR (+80V), Q806, Q807, D804 and IC802 for VBATL (-30V), Q808, D806 and IC805 for VBATH (-55V).
NG
Replace the defective parts.
OK
Check Q1, Q2 and Q3.
NG
Replace the defective parts.
OK
Check IC1.
NG
Replace the defective parts.
OK
Check DA200A-X.
NG
Replace the defective parts.
OK
END


The card does not start up
(The power supply is ON.)
Does the Card Status LED light up red?
NO
Check the power supply.
OK
Yes
(MPR initialization)
Check · Q11 Collector voltage (3.3V -> Lights up, 0V -> Goes OFF)
· IC3 Pin 28 and 163 voltage (3.3V -> Goes OFF, 0V -> Lights up)
· LED1
Is the Card Status LED flashing green?
NO
Check · U1 Collector voltage (3.3V -> Lights up, 0V -> Goes OFF)
· IC3 Pin164 voltage (3.3V -> Goes OFF, 0V -> Lights up)
· LED1
Yes
(LPR initialization)
Does the Card Status LED light up green?
NO
Check the error log with the PC programming software documentation (details of the message).
Yes
END
[LPR start up error (ROM defective)] ?
Yes
· Check soldering of terminal of IC3,IC601,607 and the peripheral parts.
· TP:12.288MHz
· TP:16.384MHz
The peripheral parts of IC might be broken. (CPU, ASIC)
Is X601 (Crystal) Oscillating?
Is X1 (Crystal) Oscillating?
NO
NO
· Check soldering of terminal of IC602 and the peripheral parts.
· Replace IC602(programmed).
· The peripheral parts of IC602 can be broken.
· The Boot program might be broken.
[LPR start up error (Checksum bad)] ?
Yes
· Check soldering of terminal of IC3, IC601 and the peripheral parts.
The peripheral parts of IC might be broken. (CPU, ASIC)
NO
NO
· Check soldering of terminal of IC602 and the peripheral parts.
· The peripheral parts of IC602 might be broken.
· The Boot program might be broken.
[LPR start up error (RAM defective)] ?
Yes
· Check soldering of terminal of IC601, IC603 and the peripheral parts.
The peripheral parts of IC might be broken. (CPU, SRAM)
NO
[LPR start up error (No program)] ?
Yes
· Check soldering of terminal of IC602 and the peripheral parts.
The peripheral parts of IC602 (Flash) might be broken.
NO
NO
Download the operating program to the IC602 (Flash).
The Flash operating program might be broken.
NO
Replace IC602 (programmed).
The Flash operating program might be broken.
[LPR start up error (No response)] ?
Yes
· Check soldering of terminal of IC3 and the peripheral parts.
The peripheral parts of IC might be broken. (ASIC)


The bell of SLT does not ring.
Check the test land between VBATH (+55V)and GND, VHR (+80V) and GND.
NG
Check voltage of Q801_D.
NG
Replace the Q801.
NG
Check the Q802 and Q803.
NG
Replace the defective parts.
OK
OK
OK
OK
Check the land between +15Vout and GND.
NG
Check the Q809 and Q810.
NG
Replace the defective parts.
OK
OK
OK
Check Q804, Q805, D803 and IC801 for VHR (+80V), Q806, Q807, D804 and IC802 for VBATL (-30V), Q808, D806 and IC805 for VBATH (-55V).
NG
Replace the defective parts.
OK
Check DA200A-X.
NG
Replace the defective parts.
OK
Check soldering of terminal of IC200A-X.
NG
Resolder the defective parts.
OK
Replace the IC200A-X.
Confirm bell signal(AC 70 to 80V) between IC200A-X_1pin and 2pin, IC200A-X_ 10pin and 11pin.
NG
Confirm sinewave signal of IC200A-X_23pin or 32pin during sending bell.
NG
Check soldering of terminal of IC201A-X.
NG
Replace the defective parts.
OK
OK
Replace the IC201A-X.
NG
Check soldering of terminal of IC200A-X
NG
Resolder the defective parts.
OK
Replace the IC200A-X.
Check R200,201,202,203A-X, D200,201A-X, RL200A-D and RL201A.
NG
Replace the defective parts.
OK
END


SLT cannot make a call.
Measure the voltage between T and R when handset is ON-HOOK. Is it about 50V ?
NG
Check the test land between VBATH (-55V) and GND. VBATL (-30V) and GND.
NG
Check voltage of Q801_D.
NG
Replace the Q801.
NG
Check the Q802 and Q803.
NG
Replace the defective parts.
OK
OK
OK
OK
Check the land between +15Vout and GND.
NG
Check the Q809 and Q810.
NG
Replace the defective parts.
OK
OK
OK
Check Q806, Q807, D804 and IC802 for VBATL (-30V), Q808, D806 and IC805 for VBATH (-55V).
NG
Replace the defective parts.
OK
Check DA200A-X.
NG
Replace the defective parts.
OK
Check soldering of terminal of IC200A-X.
NG
Resolder the defective parts.
OK
Replace the IC200A-X.
Measure the voltage between T and R when handset is OFF-HOOK. Is it about 8V-20 ?
NG
Check R200,201,202,203A-X, D200,201A-X, RL200A-D and RL201A.
NG
Replace the defective parts.
OK
OK
Check soldering of terminal of IC200A-X, IC201A-X.
NG
Resolder the defective parts.
OK
Replace the IC200A-X,IC201A-X.
Does IC200 A-X 27pin or 36pin become "L" when the handset is OFF-HOOK?
NG
Check soldering of terminal of IC200A-X.
NG
Resolder the defective parts.
OK
OK
Replace the IC200A-X.
Check soldering of terminal of IC201A-X.
NG
Resolder the defective parts.
OK
Replace the IC201A-X.
OK
END


SLT cannot output DTMF.
Is the dial tone heard when the handset is OFF-HOOK ?
NG
Go to the flowchart "SLT cannot make a call".
OK
Confirm DTMF signal of IC200A-X_ 27pin or 36pinduring sending DTMF.
NG
Check soldering of terminal of IC200A-X.
NG
Resolder the defective parts.
OK
Replace the IC200A-X.
OK
Check soldering of terminal of IC201A-X.
NG
Resolder the defective parts.
OK
Replace the IC201A-X.
OK
END


Oscillation sound (noise) is heard while calling.
Check soldering of terminal of IC200A-X.
NG
Resolder the defective parts.
NG
OK
Replace the IC200A-X.
NG
Check soldering of terminal of IC201A-X.
NG
Resolder the defective parts.
OK
OK
Replace the IC201A-X.
END
Caller ID is not detected by optional equipment.
Does this occur in a specific ports or all ports?
all ports
Check soldering of terminal of IC100.
NG
Resolder the defective parts.
OK
specific ports
Replace the IC100.
Does The bell of SLT ring ?
NG
Go to the flowchart "The bell of SLTdoes not ringl".
OK
Check soldering of terminal of IC201A-X.
NG
Resolder the defective parts.
OK
Replace the IC201A-X.
OK
END

9 Miscellaneous

9.1. Terminal Guide of the ICs Transistors and Diodes

Note: Removal and attachment of the parts must be handled with care as SLIC IC (*C1CB00002851) is solid ground plane.

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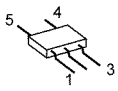
<td> 

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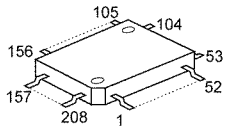
<td> 

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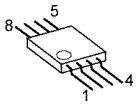
<td> 

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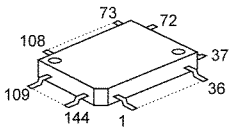
<td> 

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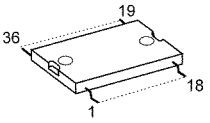
<td> 

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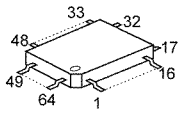
<td> 

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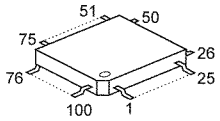
<td> 

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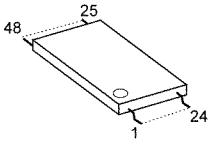
<td> 

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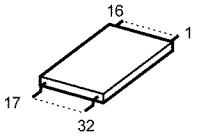
<td> 

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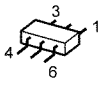
<td> 

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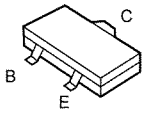
<td colspan="2"> 

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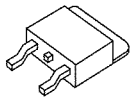
<td> 
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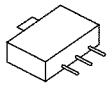
<td> 
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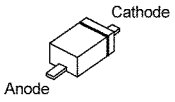
<td> 

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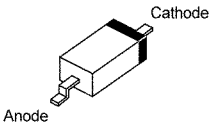
<td> 

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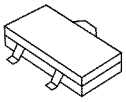
<td> 
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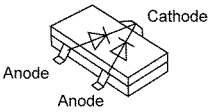
<td> 

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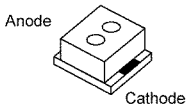
<td> 

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9.2. How To Replace a Flat Package IC

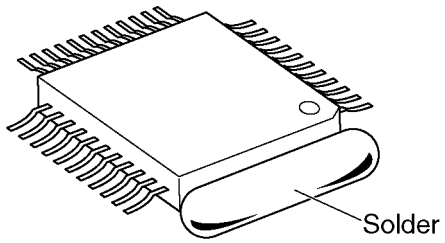
Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

9.2.1. Preparation

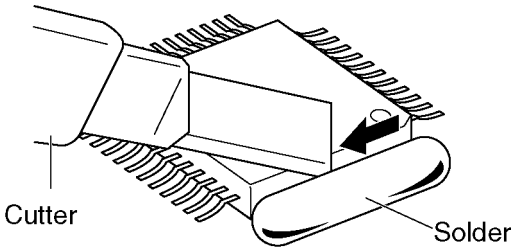
- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)
  Note: See **About Lead Free Solder (PbF: Pb free)** (P.3).

9.2.2. Removal Procedure

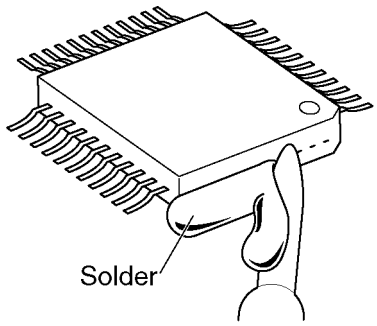
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   Note:
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



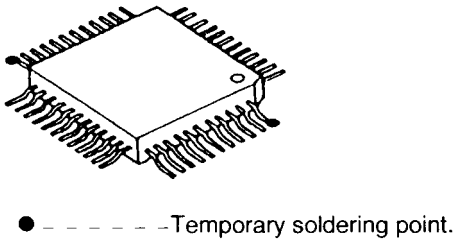
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

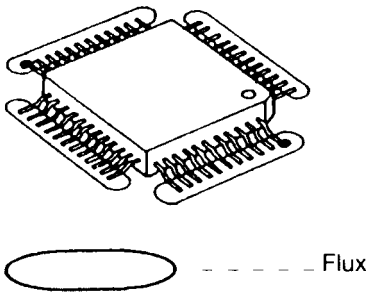
9.2.3. Procedure

1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.

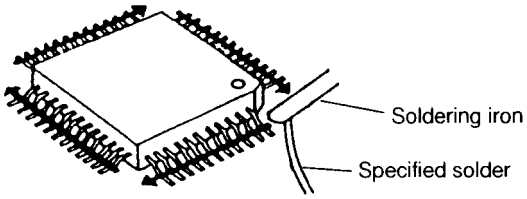


Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.

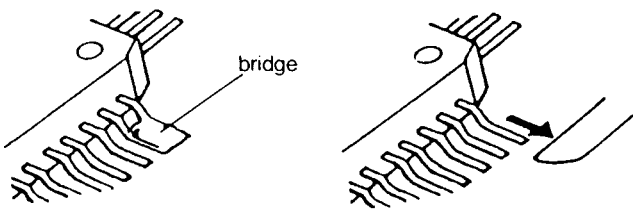


3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.



9.2.4. Removing Solder From Between Pins

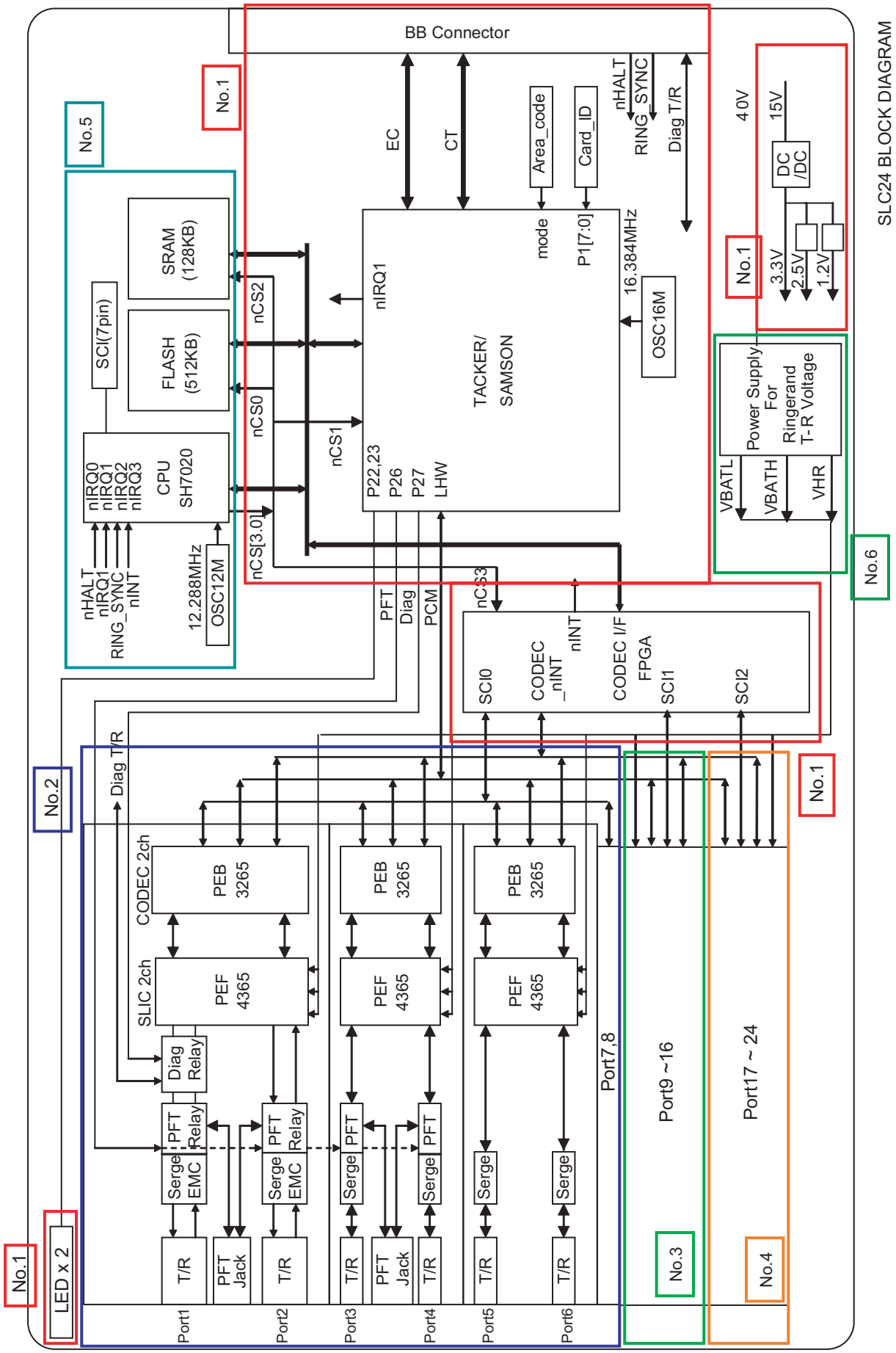
1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



9.3. Memo

10 Schematic Diagram

10.1. Block Diagram



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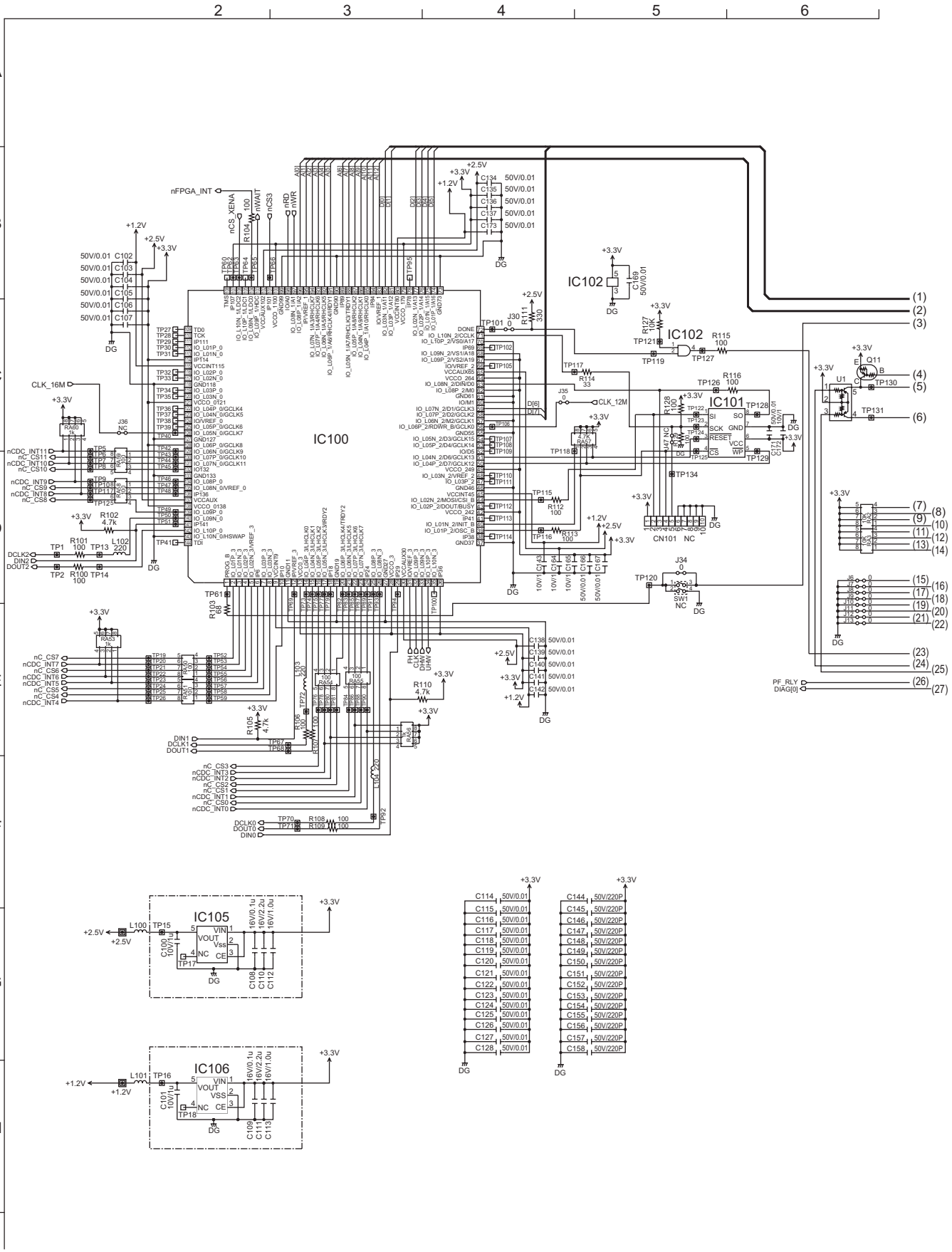
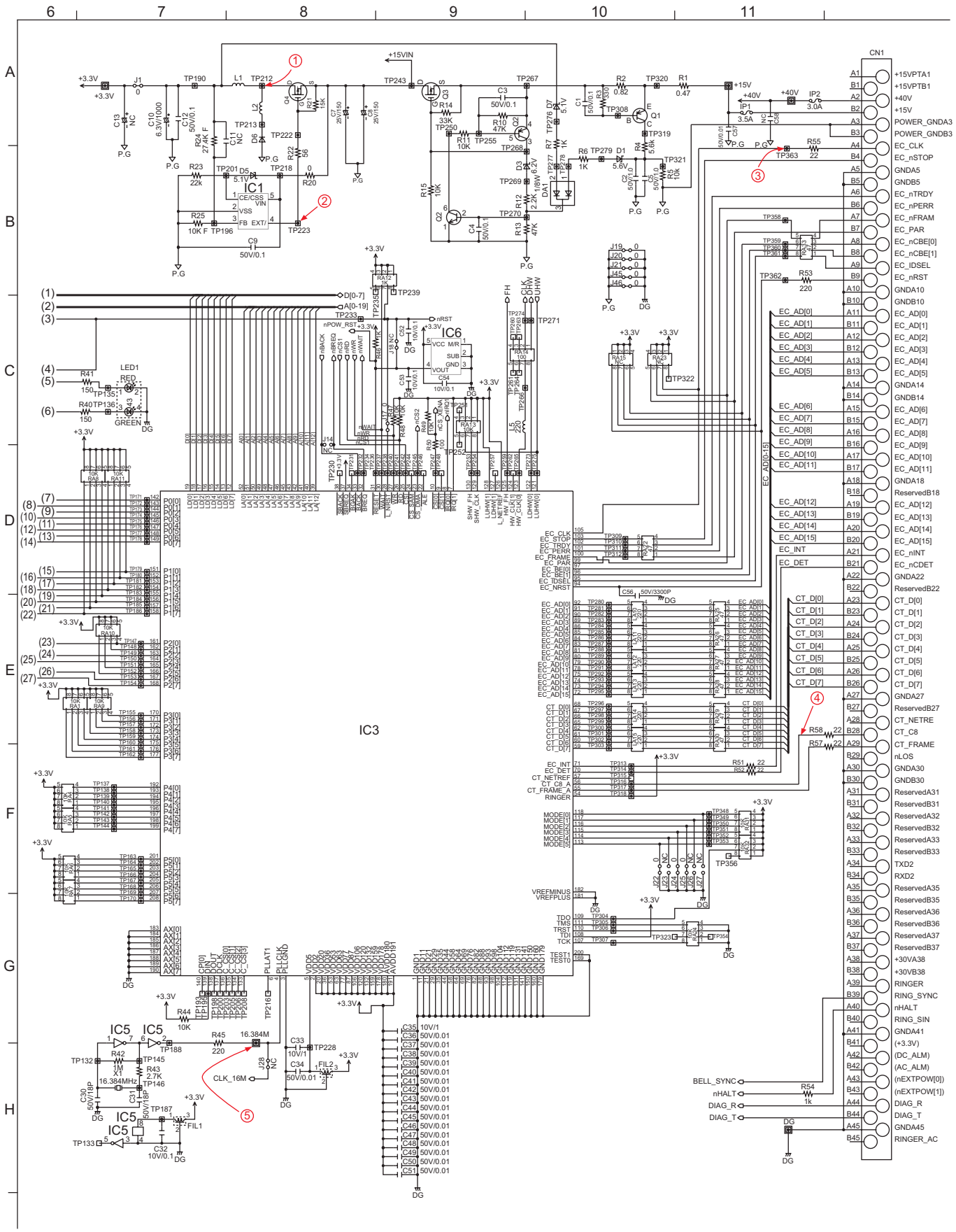
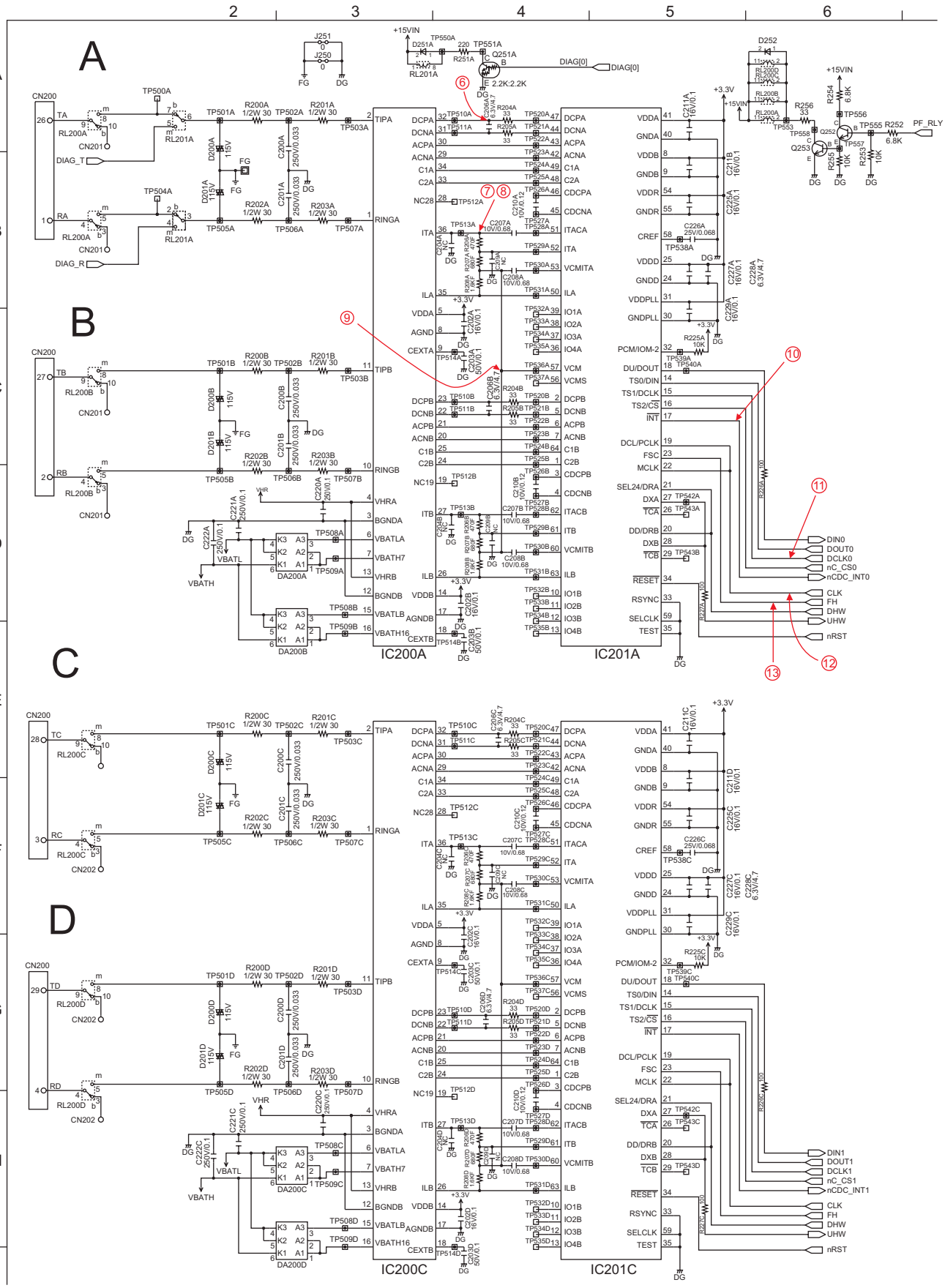


KX-TDA6178 SCHEMATIC DIAGRAM No.1 (1/2)



KX-TDA6178 SCHEMATIC DIAGRAM No.1 (2/2)

10.3. No.2



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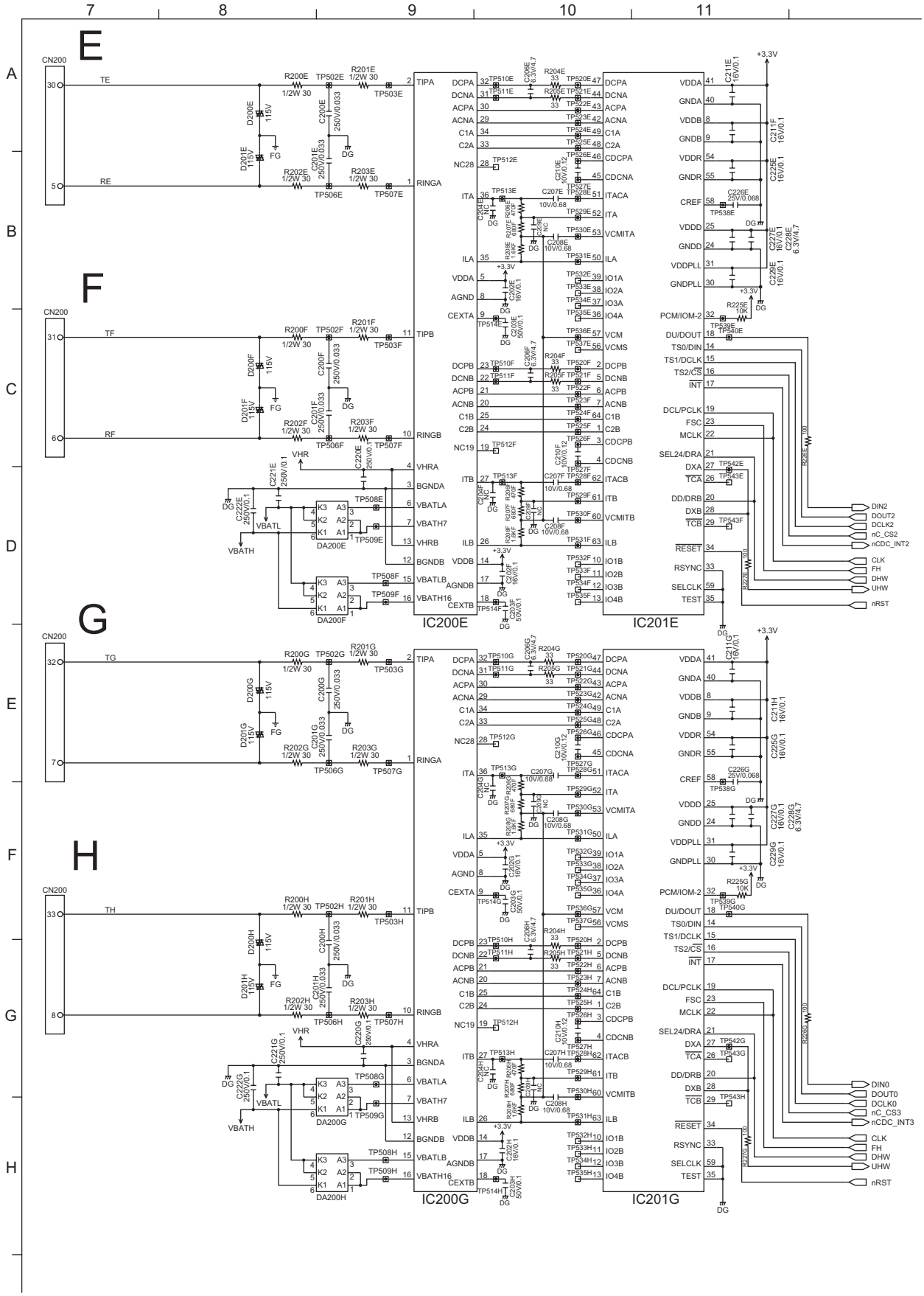

KX-TDA6178 SCHEMATIC DIAGRAM No.2 (2/2)

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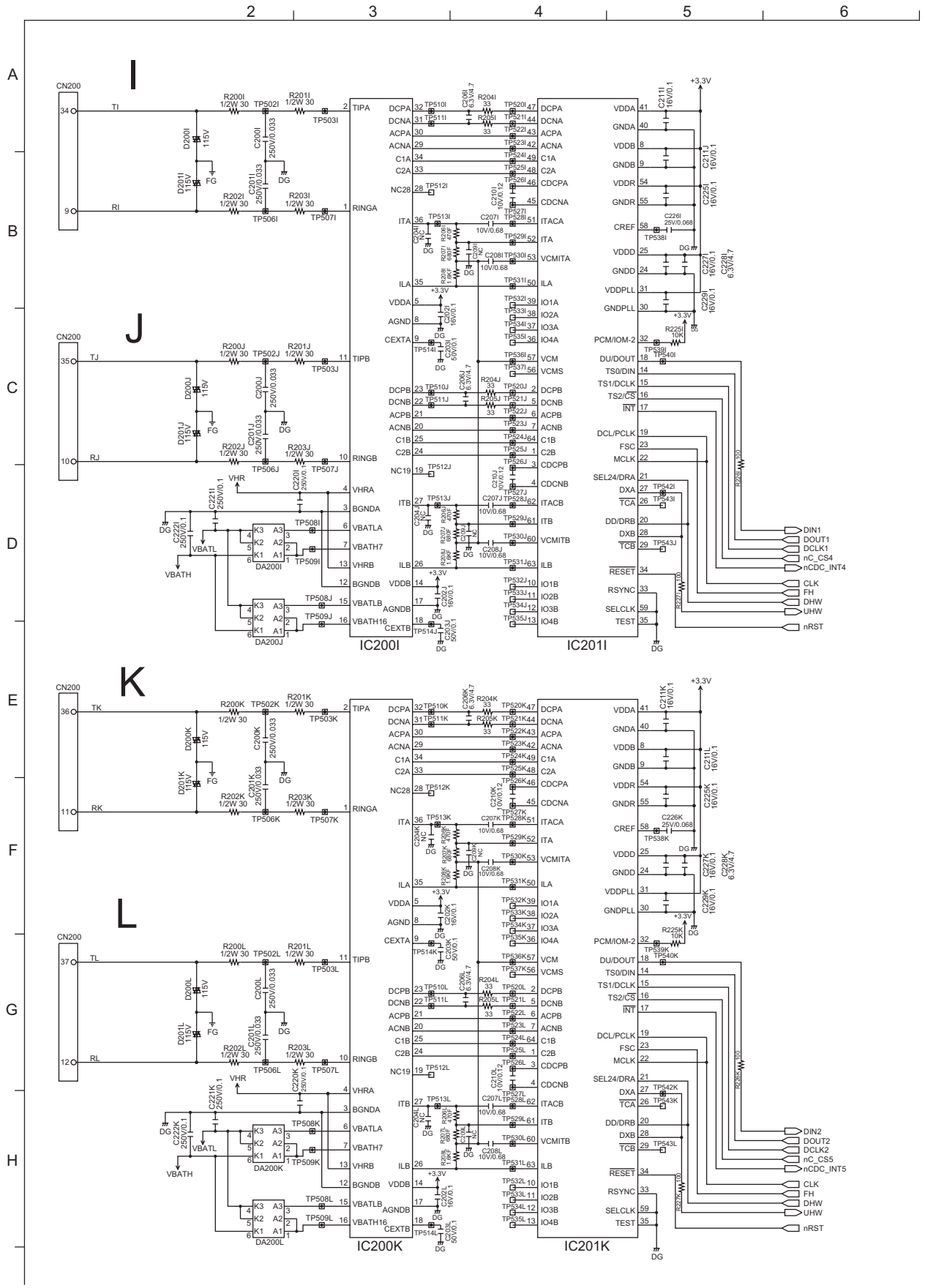

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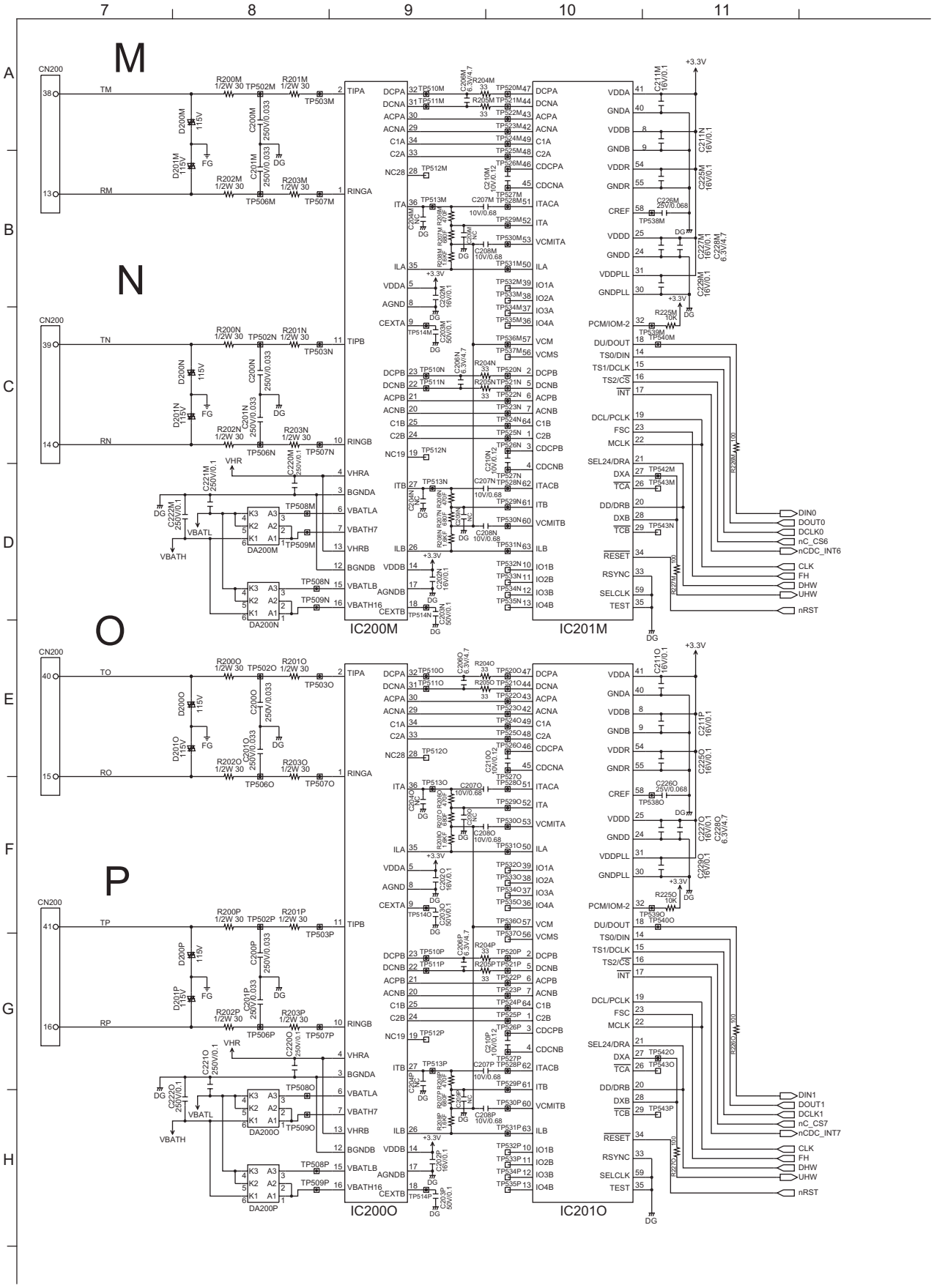

KX-TDA6178 SCHEMATIC DIAGRAM No.3 (2/2)

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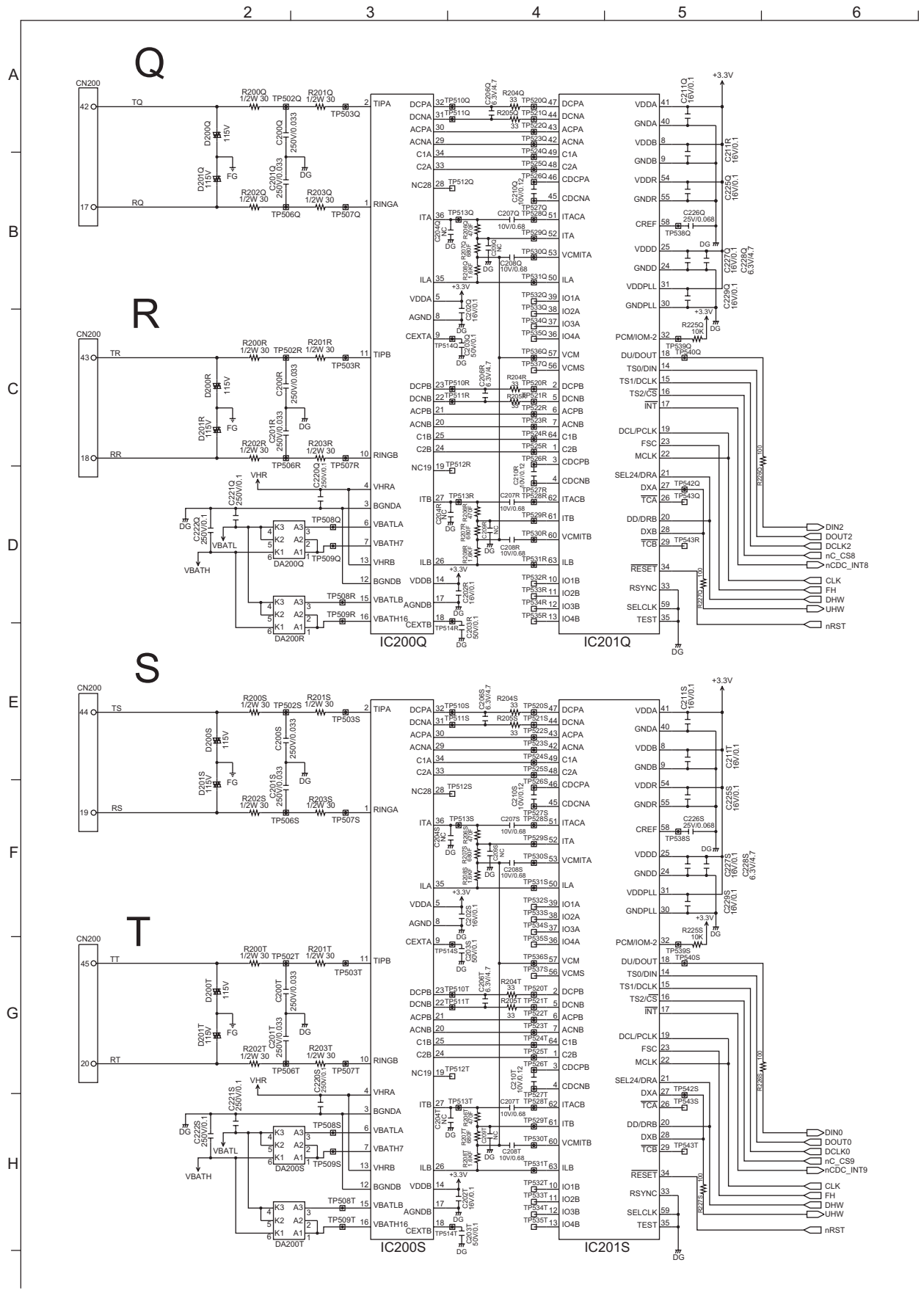

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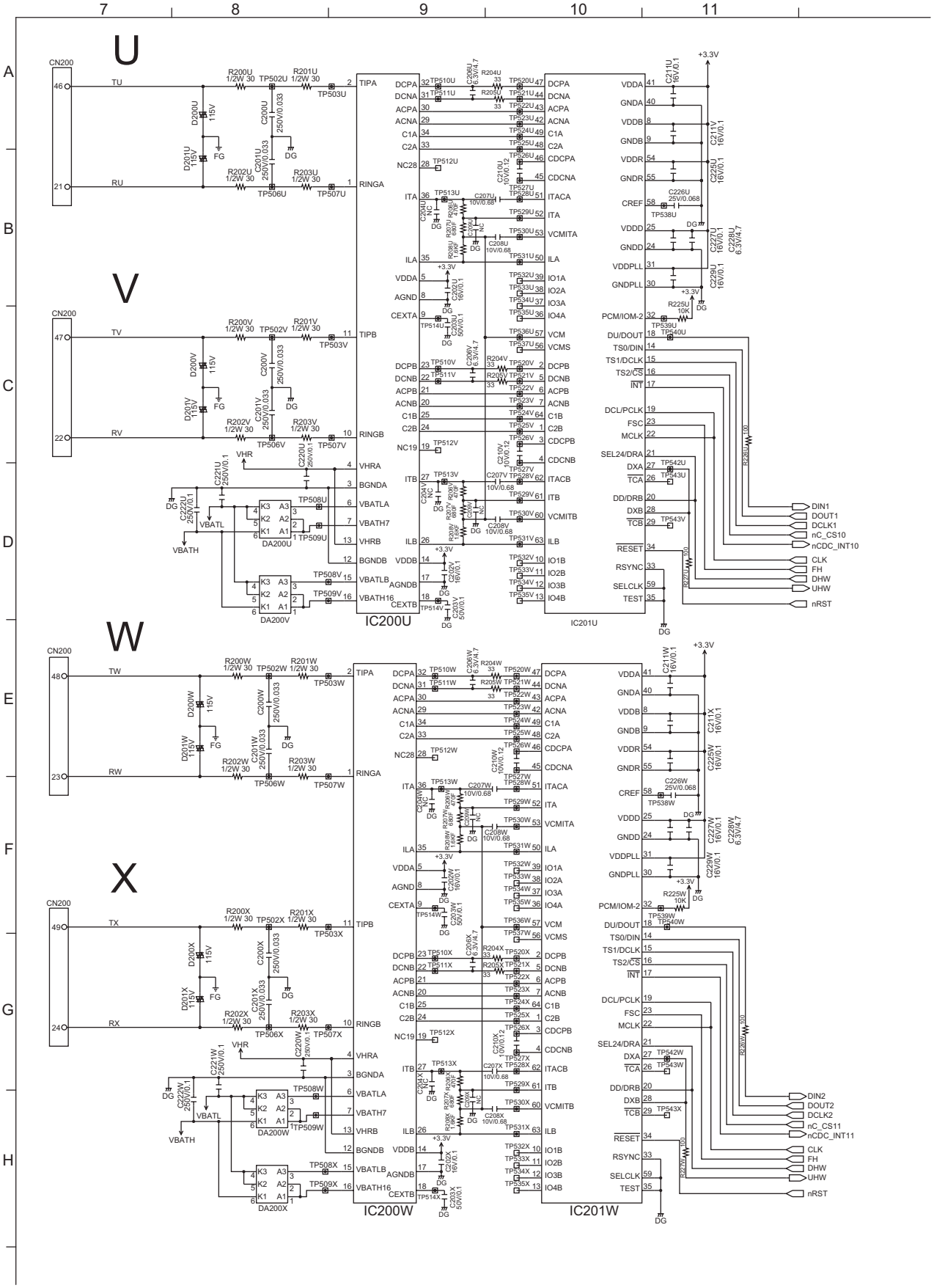

KX-TDA6178 SCHEMATIC DIAGRAM No.4 (2/2)

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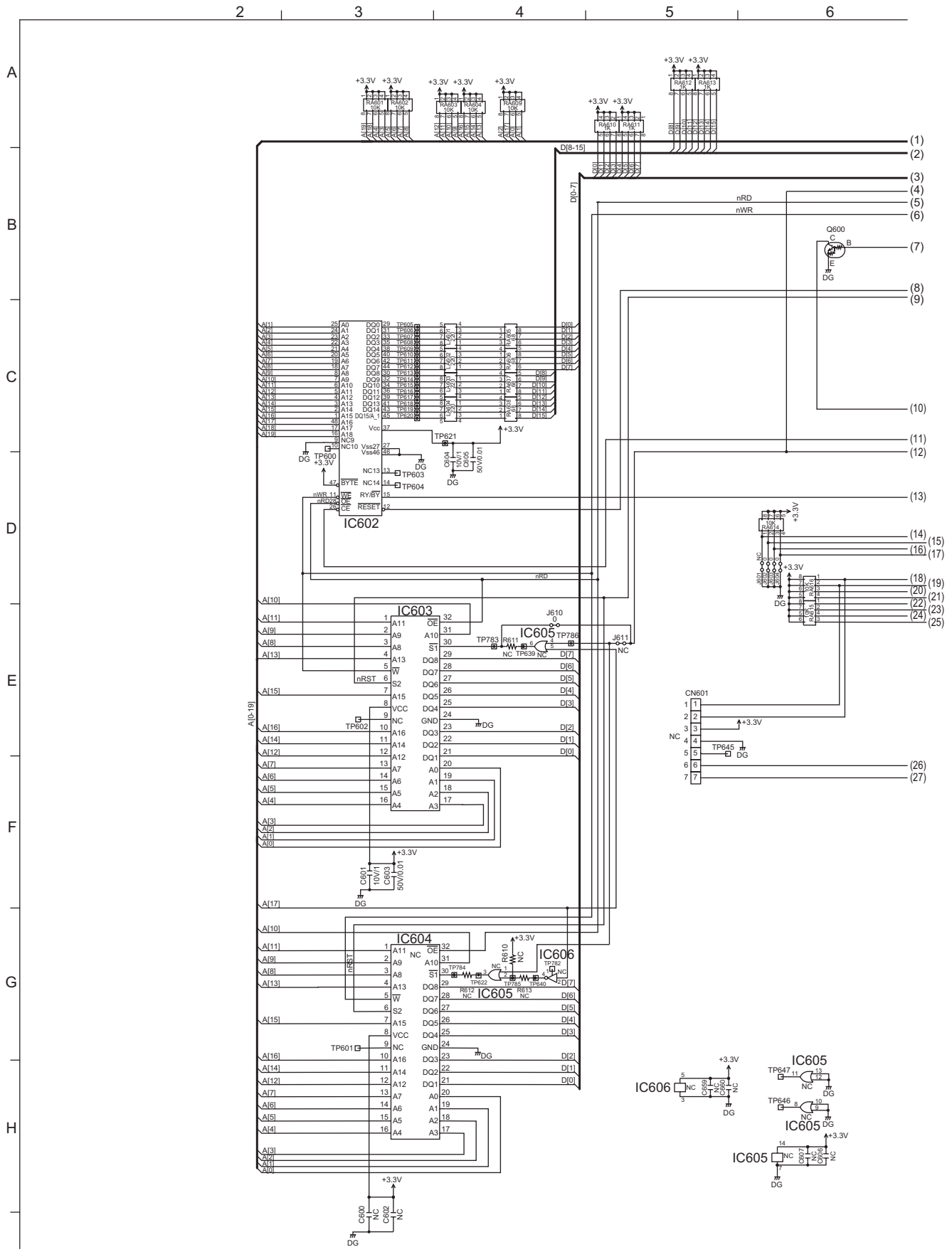
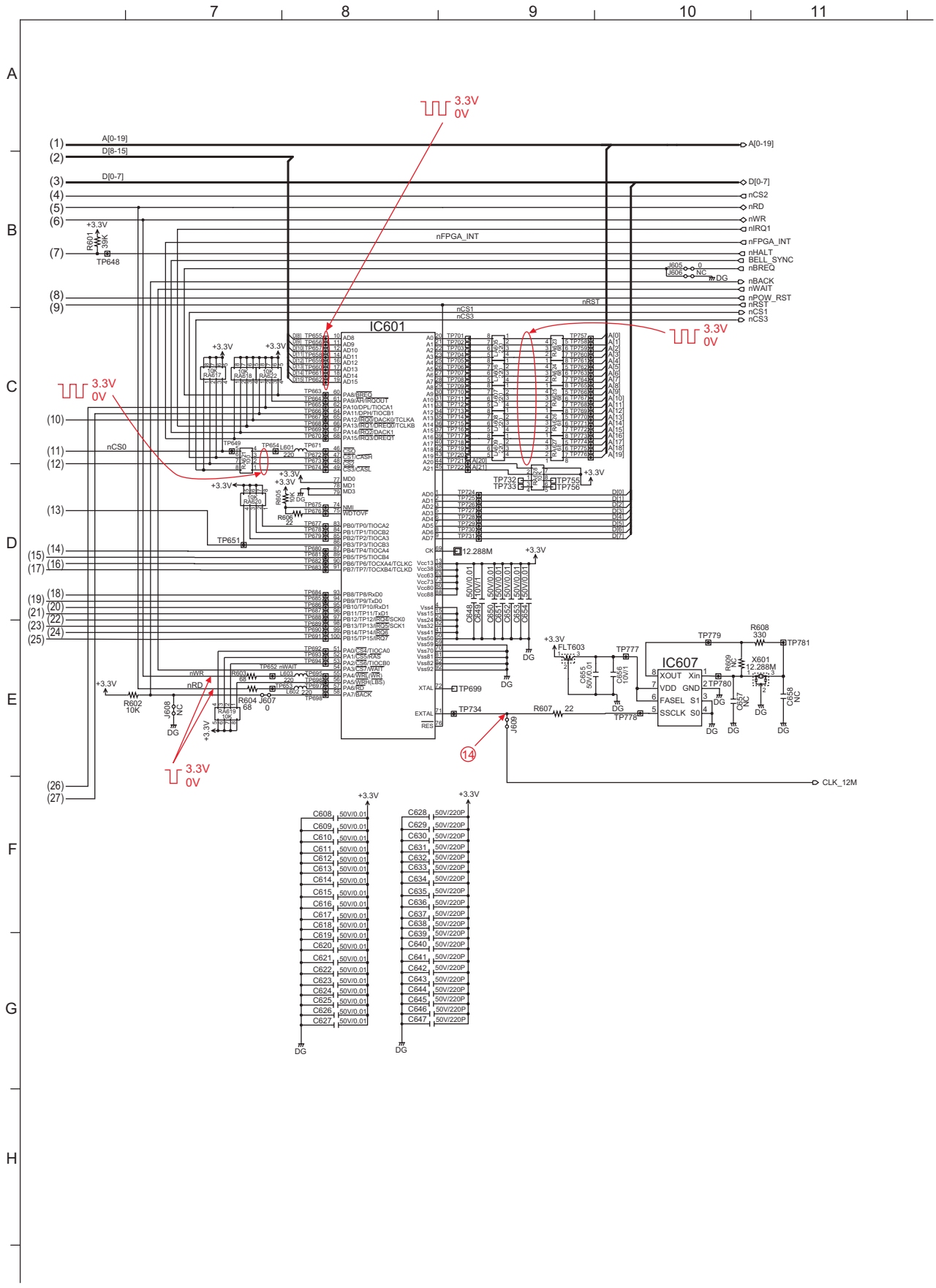


KX-TDA6178 SCHEMATIC DIAGRAM No.5 (1/2)



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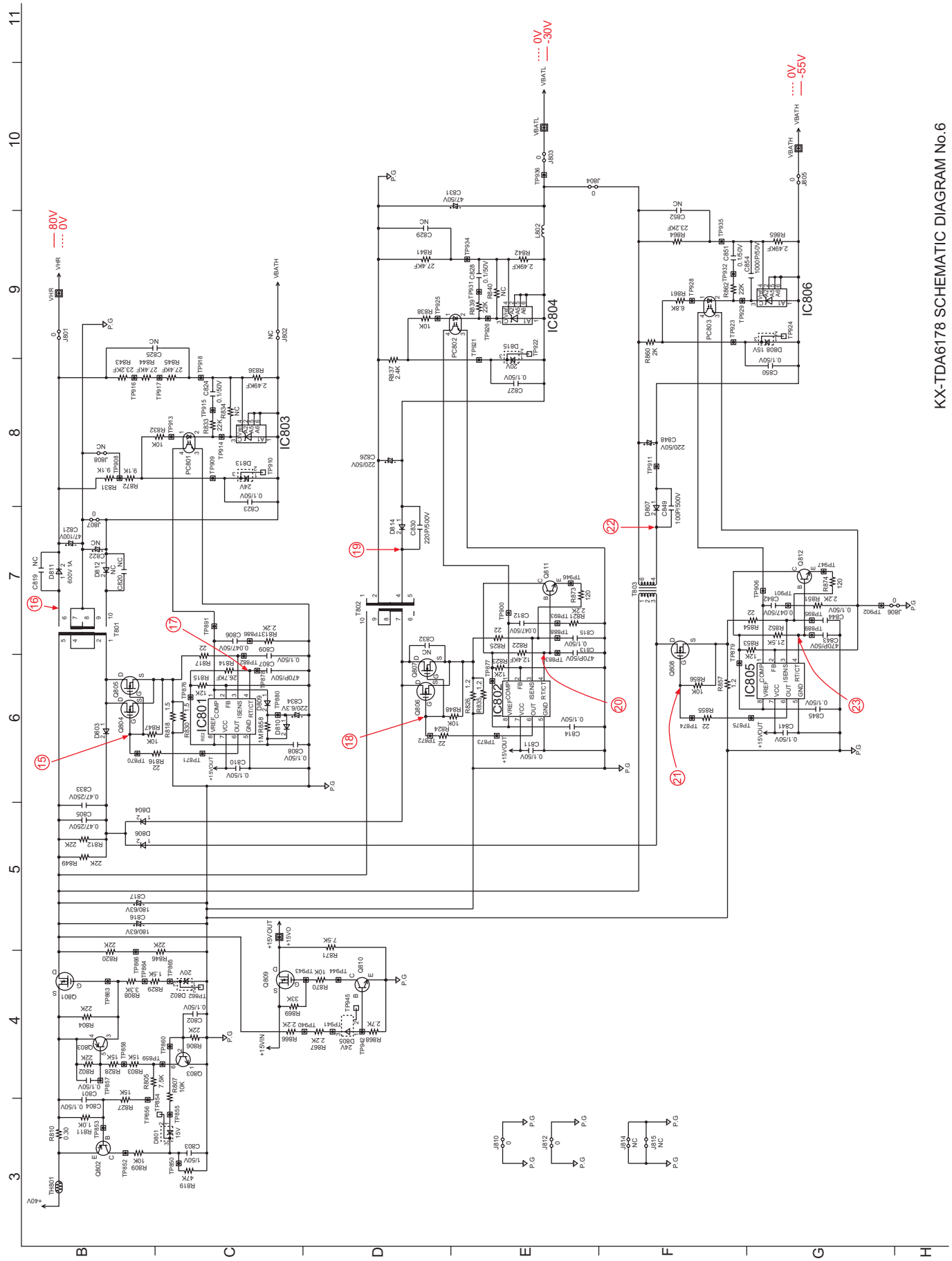
KX-TDA6178 SCHEMATIC DIAGRAM No.6
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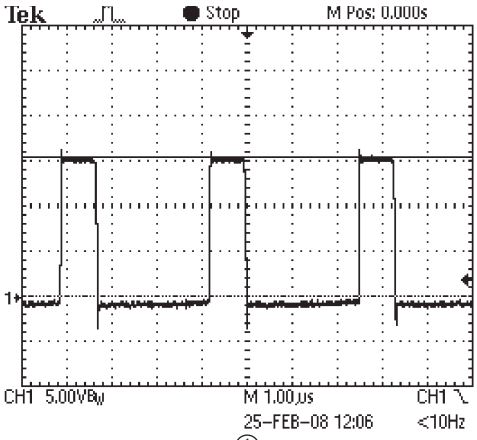
IC802
IC803
IC804
IC805
IC806
VBATL
VBATH
VHR
+15V
-15V
P.G

10.8. Waveform



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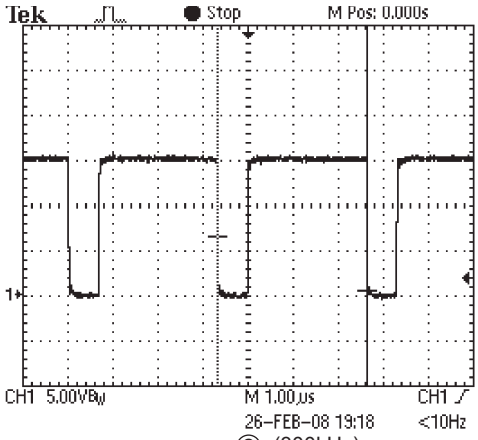
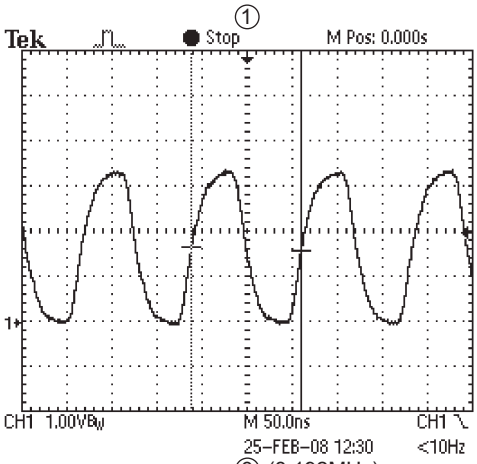
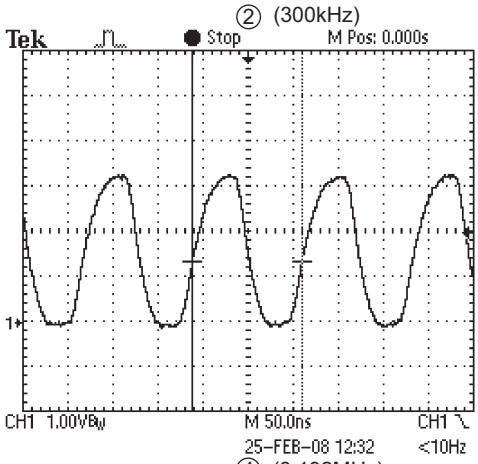


② (300kHz)



③ (8.192MHz)



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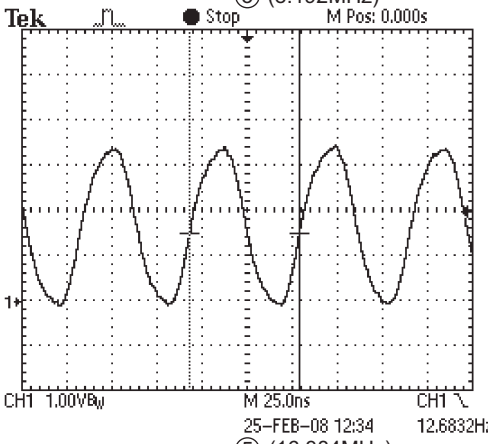
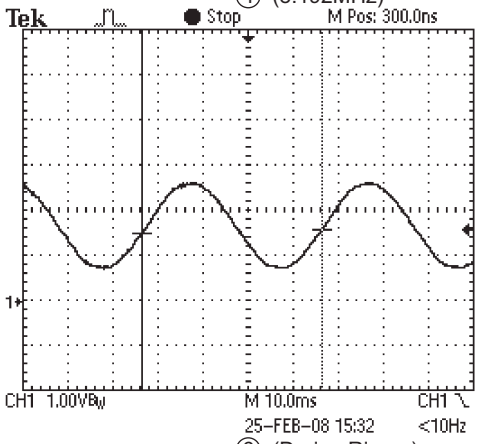


⑤ (16.384MHz)



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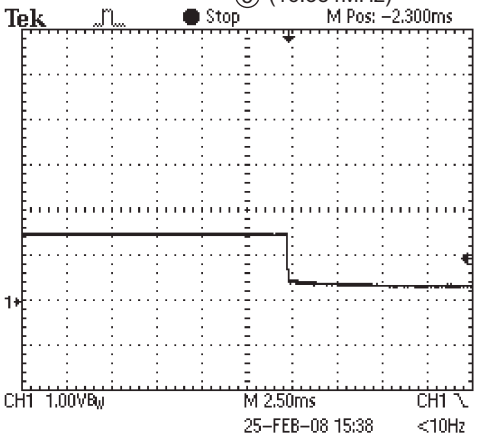
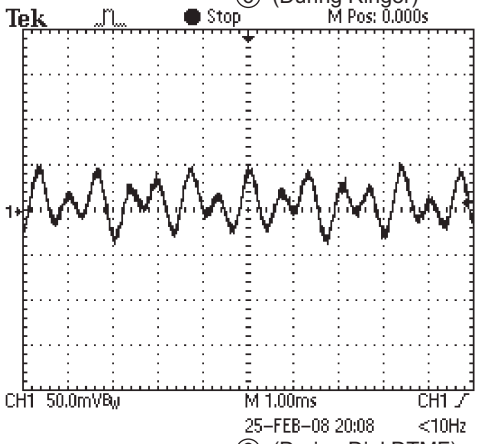
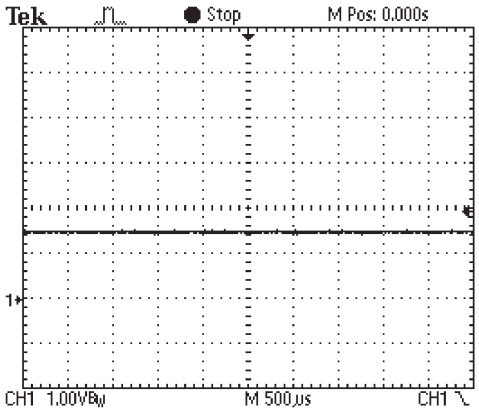


⑦ (OFF-HOOK)



⑧ (During Dial DTMF)



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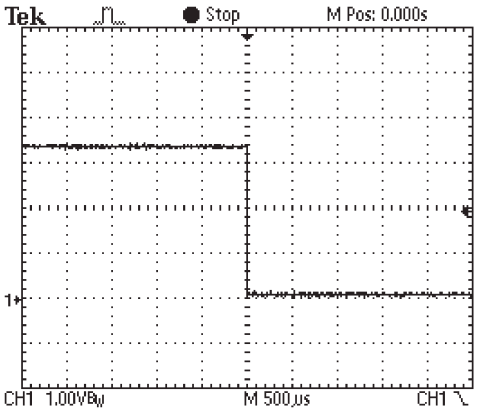

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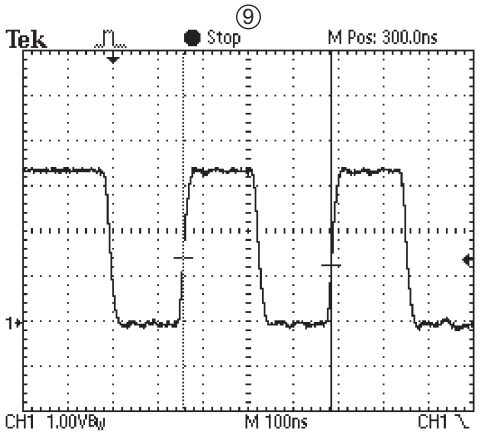

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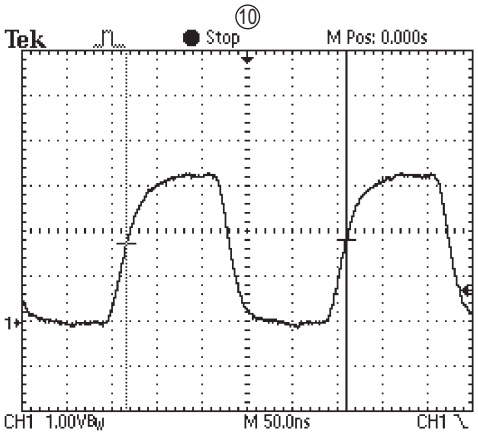
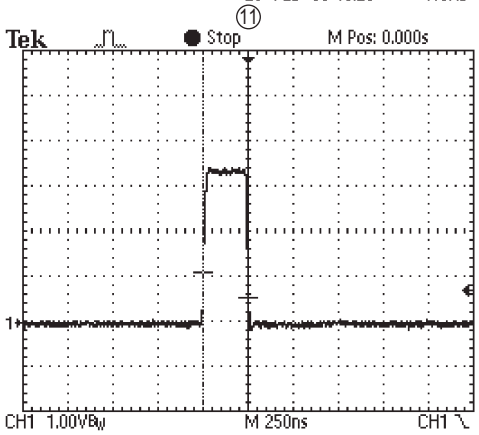


⑫ (4.096MHz)



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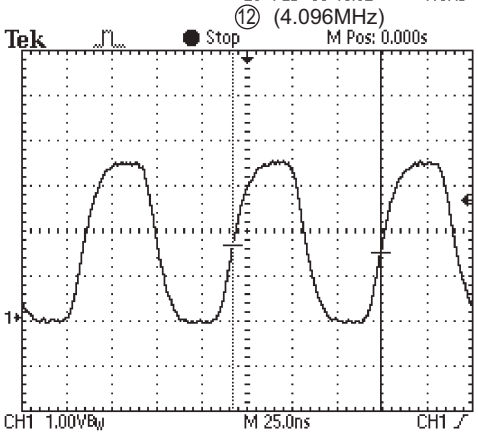
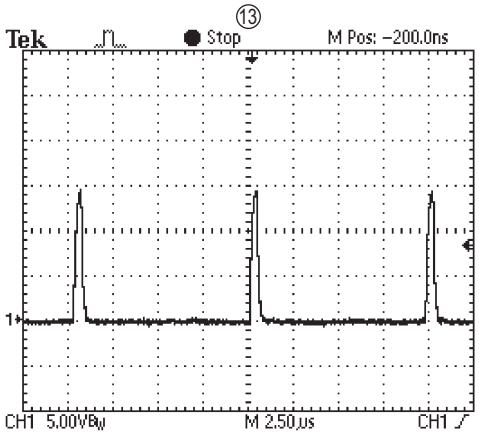


⑭ (12.288MHz)



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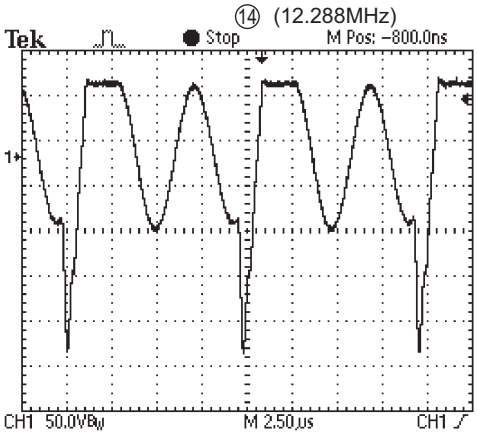
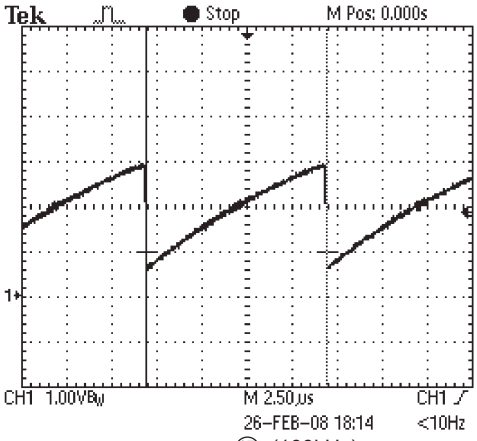
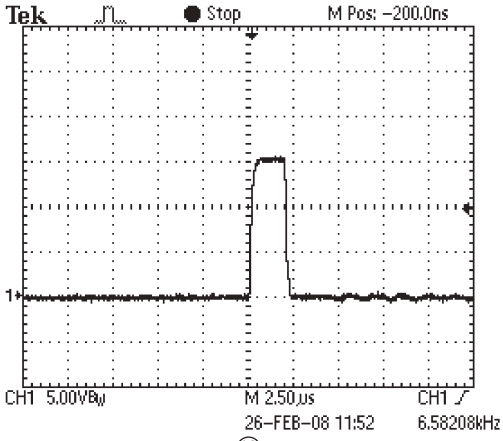


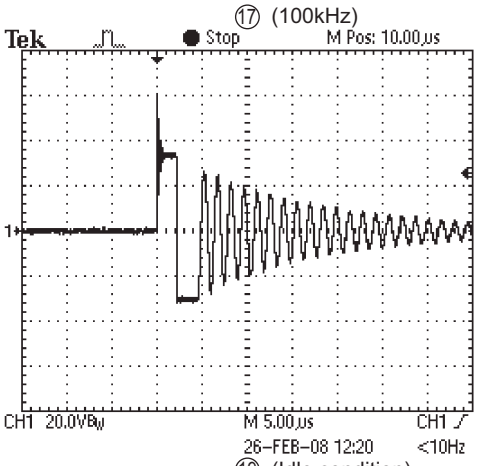
⑯ (Idle condition)



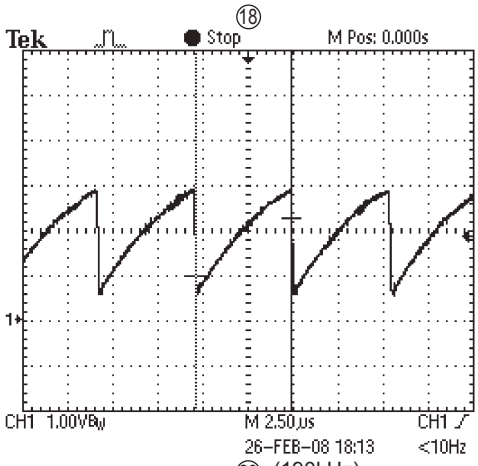
⑰ (100kHz)



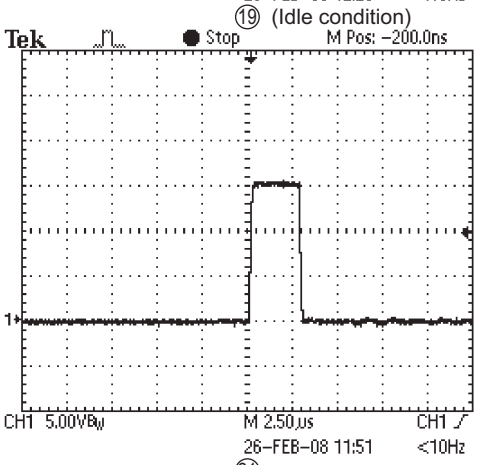
⑱



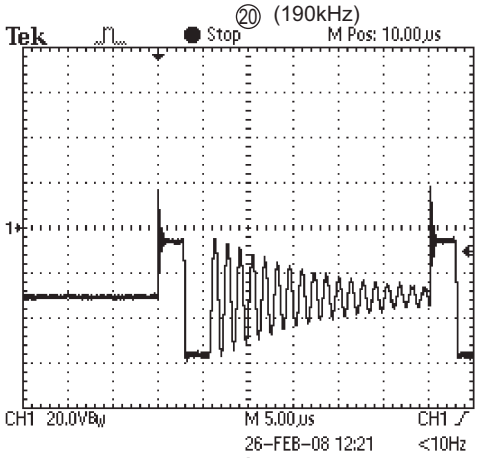
⑲ (Idle condition)



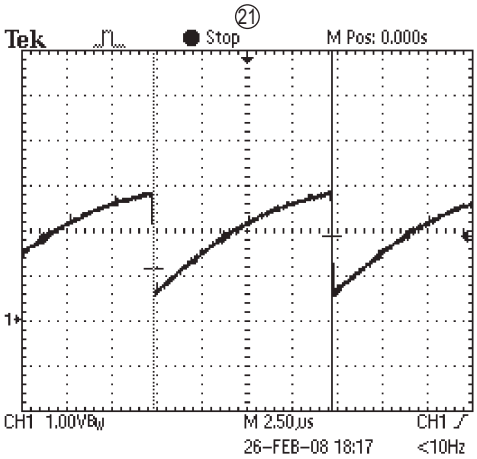
⑳ (190kHz)



㉑



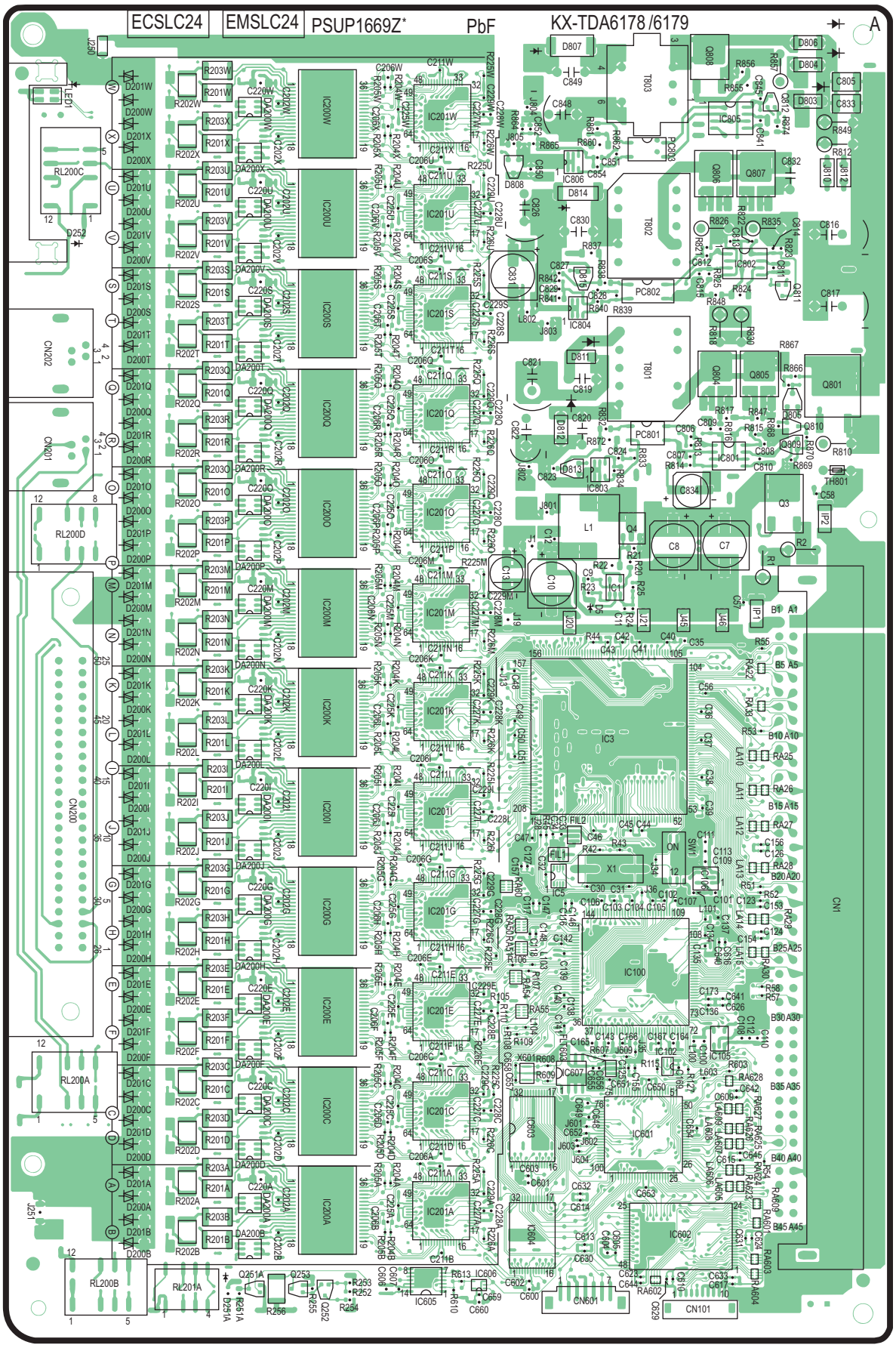
㉒ (Idle condition)



㉓ (105kHz)

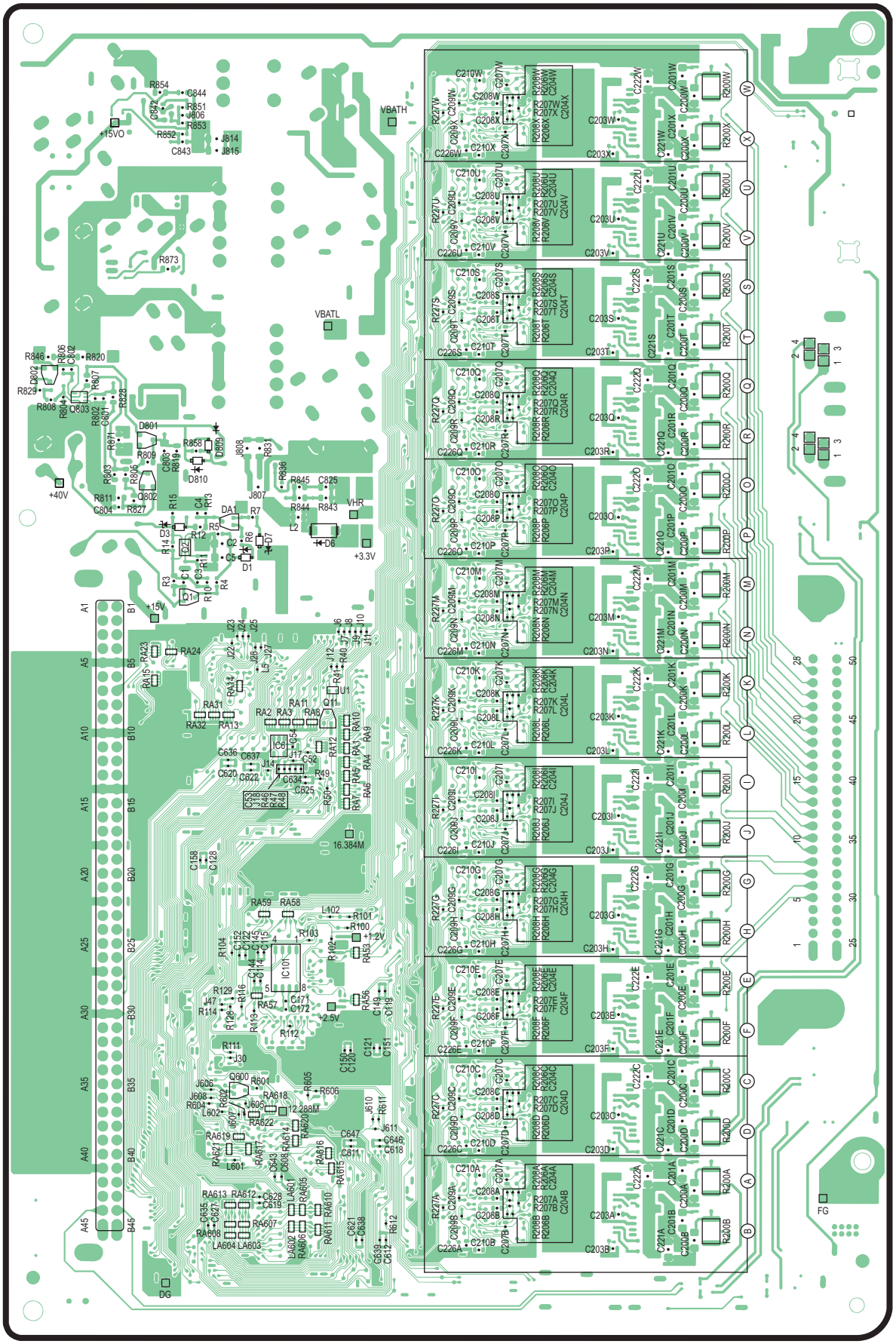
11 Printed Circuit Board

11.1. Component View



KX-TDA6178 MAIN BOARD COMPONENT VIEW

11.2. Bottom View



KX-TDA6178 MAIN BOARD BOTTOM VIEW

12 Appendix Information of Schematic Diagram

Note:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

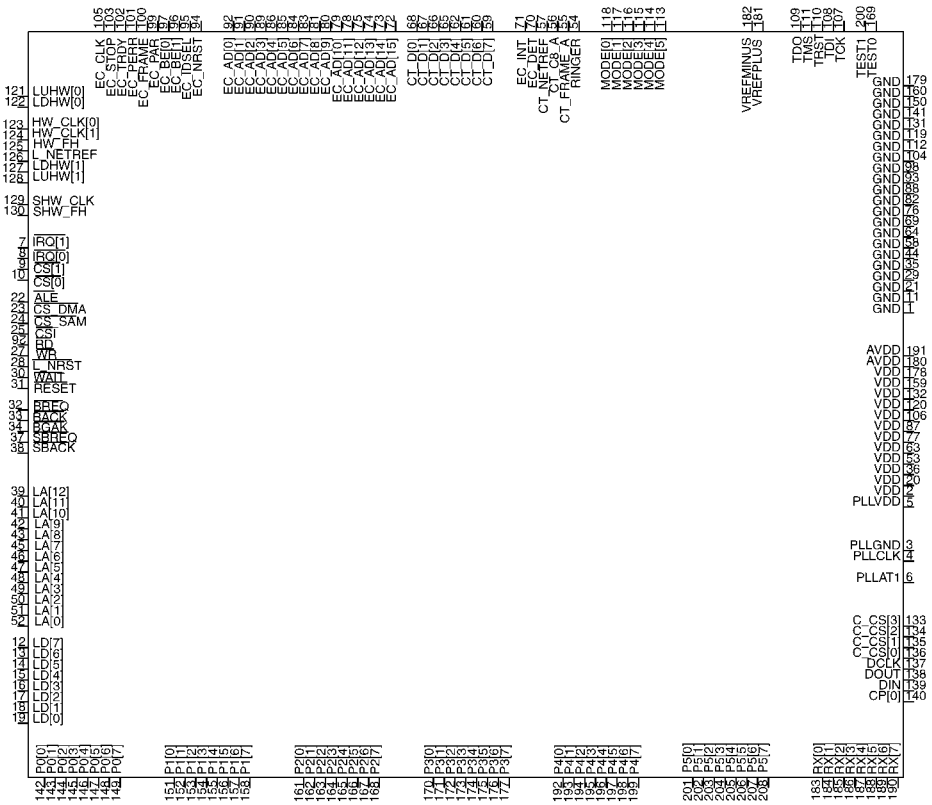
> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. This schematic diagram may be modified at any time with the development of new technology.

13 Exploded View and Replacement Parts List

13.1. IC Data

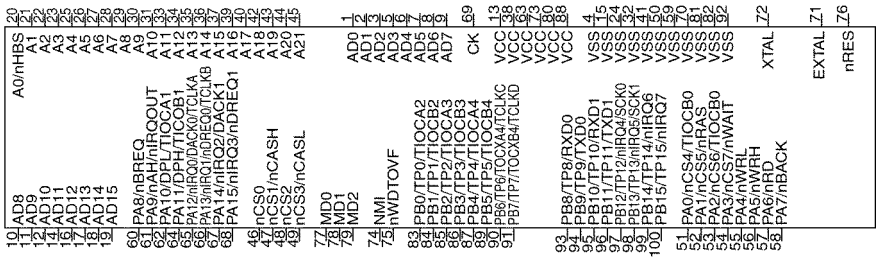
13.1.1. IC3 (ASIC)



ADDRESS	PIN No.	SIGNAL NAME	I/O	ACT	DESCRIPTIONS	NOTES
1001180	P07				Not used	
	P06				Not used	
	P05				Not used	
	P04				Not used	
	P03				Not used	
	P02				Not used	
	P01				Not used	
	P00				Not used	
1001181	P17	VER5	I	H/L		
	P16	VER4	I	H/L	Card recognition	
	P15	VER3	I	H/L	10: China, 00: etc.	
	P14	VER2	I	H/L	Hardware version management Initial No. =0	
	P13	VER1	I	H/L		
	P12	VER0	I	H/L		
	P11	PORT1	I	L	Port No. 24	
	P10	PORT0	I	L		
1001182	P27	DIAG	O	H	Diag nostic mode	
	P26	PF_RLY	O	L	Power failure direct connection switch	
	P25				Not used	
	P24				Not used	
	P23	LED_G	O	L	Green LED ON	
	P22	LED_R	O	L	RED LED ON	
	P21				Not used	
	P20	FPGA_DONE	I	H	Configuration signal from FPGA	

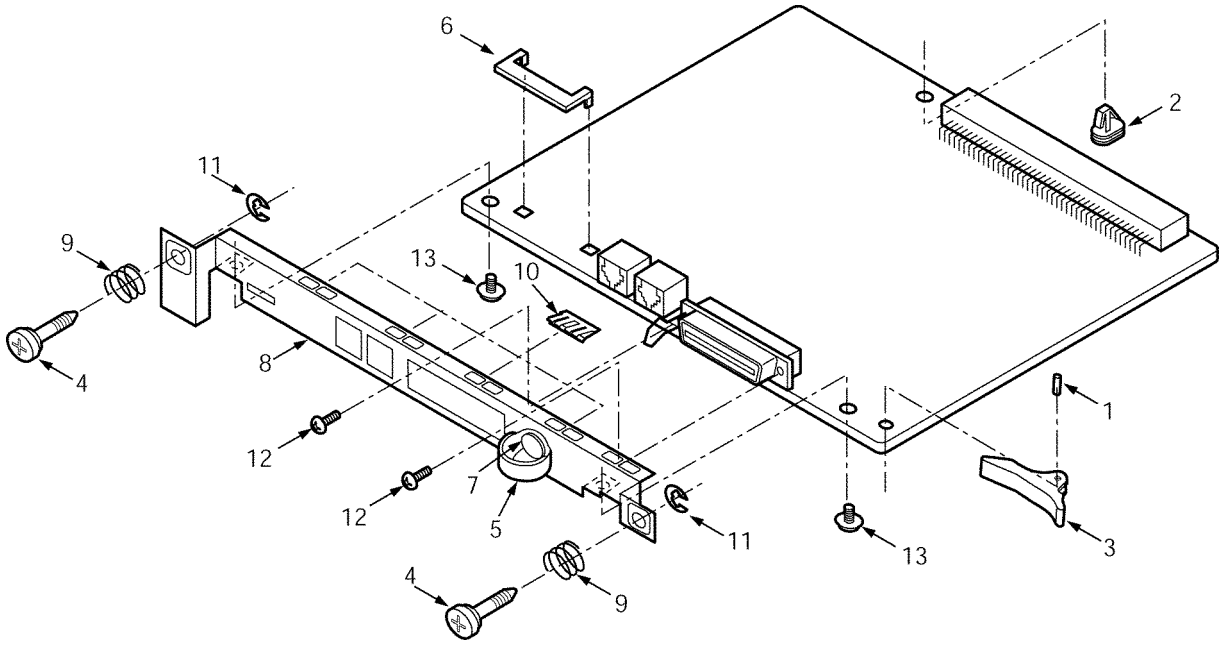
ADDRESS	PIN No.	SIGNAL NAME	I/O	ACT	DESCRIPTIONS	NOTES
1001183	P37				Not used	
	P36				Not used	
	P35				Not used	
	P34				Not used	
	P33				Not used	
	P32				Not used	
	P31				Not used	
	P30				Not used	
1001184	P47				Not used	
	P46				Not used	
	P45				Not used	
	P44				Not used	
	P43				Not used	
	P42				Not used	
	P41				Not used	
	P40				Not used	
1001185	P57				Not used	
	P56				Not used	
	P55				Not used	
	P54				Not used	
	P53				Not used	
	P52				Not used	
	P51				Not used	
	P50				Not used	

13.1.2. IC601 (CPU) I/O MAP

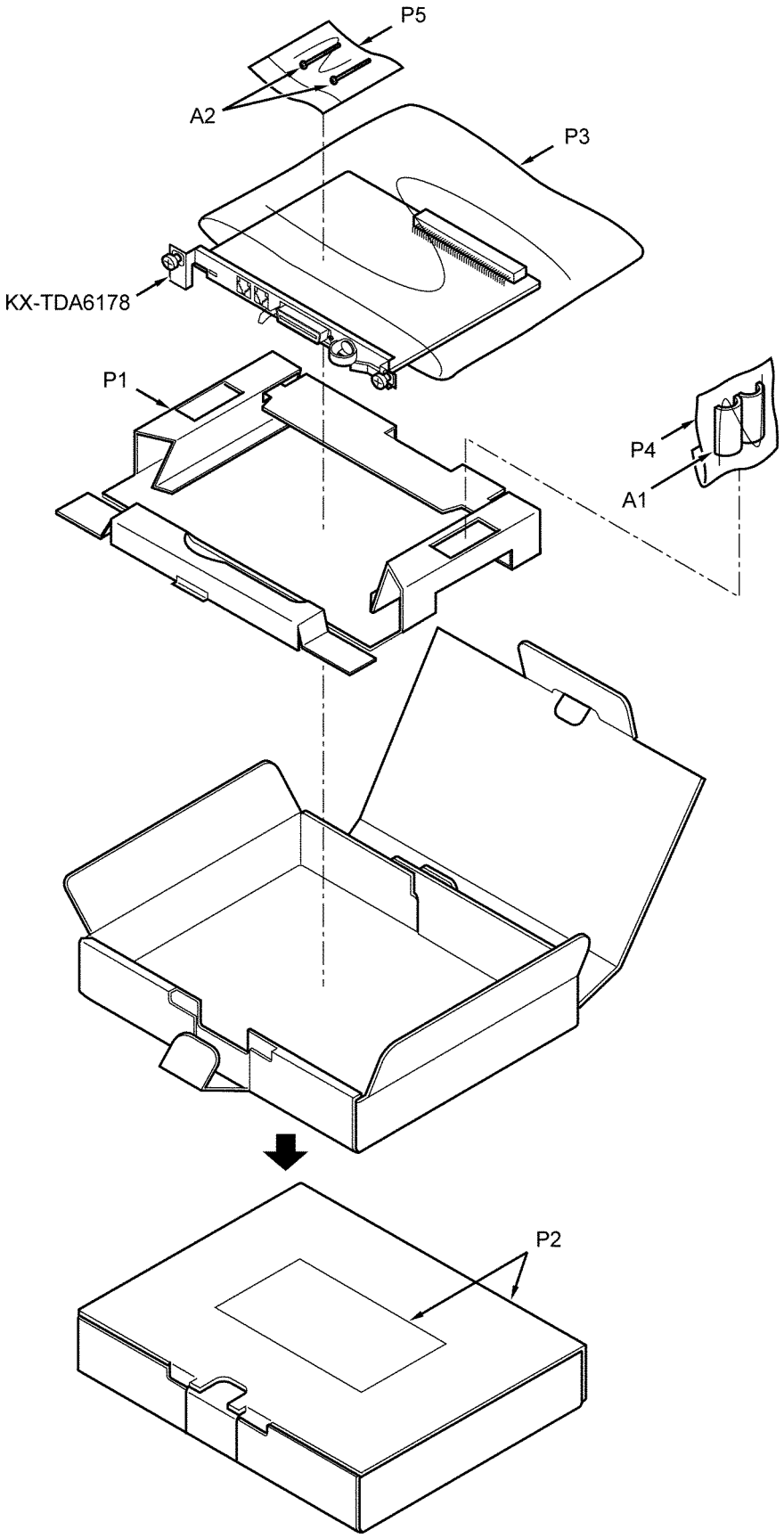


Pin No.	Pin name	Signal name	I/O	ACT	Description	Remarks
68	PA15	(nIRQ3	I	L	FPGA Interrupt	
67	PA14	(nIRQ2	I	L	BELL phase detection	
66	PA13	(nIRQ1	I	L	EMPR interrupt	
65	PA12	(nIRQ0	I	L	DC power down recovery detection	
64	PA11	nRTS	O	L	Serial I/F for debug	
62	PA10	nCTS	I	L	Serial I/F for debug	
61	PA9		O		Not used	
60	PA8	(nBREQ				
58	PA7	(nBACK				
57	PA6	(nRD				
56	PA5		O		Not used	
55	PA4	(nWR				
54	PA3	(nWAIT				
53	PA2		O		Not used	
52	PA1		O		Not used	
51	PA0		O		Not used	
100	PB15		O		Not used	
99	PB14		O		Not used	
98	PB13		O		Not used	
97	PB12		O		Not used	
96	PB11		O		Not used	
95	PB10		O		Not used	
94	PB9	(TXD0			Serial I/F for debug	
93	PB8	(RXD0			Serial I/F for debug	
91	PB7	BID2	I	H/L		
90	PB6	BID1	I	H/L	Board classification judgment (Use undecided)	
89	PB5	BID0	I	H/L	Board classification judgment (Use undecided)	
87	PB4	PB4	I	H	H: Operation, L: Debug	
86	PB3	nFlash Busy	I	L	Flash memory Busy	
85	PB2		O	L	Not used	
84	PB1		O		Not used	
83	PB0		O		Not used	

13.2. Cabinet and Electrical Parts Location



13.3. Accessories and Packing Material



13.4. Replacement Parts List

Note:

1. RTL (Retention Time Limited)
   The "RTL" marking indicates that its Retention Time is Limited.
   When production is discontinued, this item will continue to be available only for
   a specific period of time. This period of time depends on the type of item,
   and the local laws governing parts and product retention.
   At the end of this period, the item will no longer be available.
2. Important safety notice
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω), k=1000Ω, M=1000kΩ
   All capacitors are in MICRO FARADS (μF), p=μμF
   *Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

13.4.1. Cabinet and Electrical Parts Location

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQDF996Z	SHAFT	
2	PQHR10005Z	SPACER	
3	PQUB14Z2	LEVER, EJECTOR	
4	PSHD1088Z	SCREW	
5	PSHE1106Z	TAPE	
6	PSHR1238Z	SPACER, PANEL LIGHT	
7	PSHR1272Z	REVET	
8	PSMH1212S	PANEL, FRONT	
9	PSUS1020Z	TORSION SPRING	
10	PSUS1021Y	TORSION SPRING	
11	XUC25VW	RING	
12	XSN4X40+6FN	SCREW	
13	XYN3+F6FJ	SCREW	

13.4.2. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	J0KG00000019	FILTER, CORE	
A2	XSN4X40+28FK	SCREW	
P1	PSPD1188X	CUSHION	
P2	PSZKTDA6178M	GIFT BOX	
P3	PSPP1069Z	PROTECTION COVER	
P4	PSPP1077Z	PROTECTION COVER	
P5	XZB05X08A03	PROTECTION COVER	

13.4.3. Main Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
		(ICS)	
IC1	C0DBAYY00242	IC	
IC3	C1CB00002760	IC	
IC5	C0JBAB000535	IC	
IC6	PSVIPST596IN	IC	
IC100	C1ZBZ0003806	IC	
IC101	PSWI1A6178XJ	IC	
IC102	C0JBAA000319	IC	
IC105	C0CBAAC00083	IC	
IC106	C0CBCAC00072	IC	
IC200A	C1CB00002851	IC	
IC200C	C1CB00002851	IC	
IC200E	C1CB00002851	IC	
IC200G	C1CB00002851	IC	
IC200I	C1CB00002851	IC	
IC200K	C1CB00002851	IC	
IC200M	C1CB00002851	IC	
IC200O	C1CB00002851	IC	
IC200Q	C1CB00002851	IC	
IC200S	C1CB00002851	IC	
IC200U	C1CB00002851	IC	
IC200W	C1CB00002851	IC	
IC201A	C1CB00002850	IC	
IC201C	C1CB00002850	IC	
IC201E	C1CB00002850	IC	
IC201G	C1CB00002850	IC	
IC201I	C1CB00002850	IC	
IC201K	C1CB00002850	IC	
IC201M	C1CB00002850	IC	
IC201O	C1CB00002850	IC	
IC201Q	C1CB00002850	IC	
IC201S	C1CB00002850	IC	
IC201U	C1CB00002850	IC	
IC201W	C1CB00002850	IC	
IC601	C2CBYE000011	IC	
IC602	PSWI2A6178XJ	IC	
IC603	C3BBHC000368	IC	
IC607	C1CB00001775	IC	
IC801	C0DBAJD00003	IC	
IC802	C0DBAJD00003	IC	
IC803	C0DBZZB00005	IC	
IC804	C0DBZZB00005	IC	
IC805	C0DBAJD00003	IC	
IC806	C0DBZZB00005	IC	
		(TRANSISTORS)	
Q1	2SA1576R	TRANSISTOR(SI)	S
Q2	XP4601	TRANSISTOR(SI)	S
Q3	B1CHRD000011	TRANSISTOR(SI)	
Q4	B1CHRC000007	TRANSISTOR(SI)	
Q11	PQVTDTA114EU	TRANSISTOR(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
Q251A	PQVTDTC123E	TRANSISTOR(SI)	S
Q252	B1ABDF000026	TRANSISTOR(SI)	
Q253	B1ABDF000026	TRANSISTOR(SI)	
Q600	PQVTDTC114YU	TRANSISTOR(SI)	S
Q801	B1CHRG000012	TRANSISTOR(SI)	
Q802	B1ADGJ000002	TRANSISTOR(SI)	
Q803	XP4601	TRANSISTOR(SI)	S
Q804	B1CFRM000009	TRANSISTOR(SI)	
Q805	B1CFRM000009	TRANSISTOR(SI)	
Q806	B1CFRM000009	TRANSISTOR(SI)	
Q807	B1CFRM000009	TRANSISTOR(SI)	
Q808	B1CFRM000009	TRANSISTOR(SI)	
Q809	B1DHBD000003	TRANSISTOR(SI)	
Q810	2SC4081R	TRANSISTOR(SI)	S
Q811	2SC4081R	TRANSISTOR(SI)	S
Q812	2SC4081R	TRANSISTOR(SI)	S
U1	B1GHCFJJ0007	TRANSISTOR(SI)	S
		(DIODES)	
D1	MAZ80560ML	DIODE(SI)	
D3	MAZ80620ML	DIODE(SI)	
D5	MA8051	DIODE(SI)	S
D6	B0JCQD000005	DIODE(SI)	
D7	MA8051	DIODE(SI)	S
D200A	B2ZBZ0000027	THYRISTOR	
D200B	B2ZBZ0000027	THYRISTOR	
D200C	B2ZBZ0000027	THYRISTOR	
D200D	B2ZBZ0000027	THYRISTOR	
D200E	B2ZBZ0000027	THYRISTOR	
D200F	B2ZBZ0000027	THYRISTOR	
D200G	B2ZBZ0000027	THYRISTOR	
D200H	B2ZBZ0000027	THYRISTOR	
D200I	B2ZBZ0000027	THYRISTOR	
D200J	B2ZBZ0000027	THYRISTOR	
D200K	B2ZBZ0000027	THYRISTOR	
D200L	B2ZBZ0000027	THYRISTOR	
D200M	B2ZBZ0000027	THYRISTOR	
D200N	B2ZBZ0000027	THYRISTOR	
D200O	B2ZBZ0000027	THYRISTOR	
D200P	B2ZBZ0000027	THYRISTOR	
D200Q	B2ZBZ0000027	THYRISTOR	
D200R	B2ZBZ0000027	THYRISTOR	
D200S	B2ZBZ0000027	THYRISTOR	
D200T	B2ZBZ0000027	THYRISTOR	
D200U	B2ZBZ0000027	THYRISTOR	
D200V	B2ZBZ0000027	THYRISTOR	
D200W	B2ZBZ0000027	THYRISTOR	
D200X	B2ZBZ0000027	THYRISTOR	
D201A	B2ZBZ0000027	THYRISTOR	
D201B	B2ZBZ0000027	THYRISTOR	
D201C	B2ZBZ0000027	THYRISTOR	
D201D	B2ZBZ0000027	THYRISTOR	
D201E	B2ZBZ0000027	THYRISTOR	
D201F	B2ZBZ0000027	THYRISTOR	
D201G	B2ZBZ0000027	THYRISTOR	
D201H	B2ZBZ0000027	THYRISTOR	
D201I	B2ZBZ0000027	THYRISTOR	
D201J	B2ZBZ0000027	THYRISTOR	
D201K	B2ZBZ0000027	THYRISTOR	
D201L	B2ZBZ0000027	THYRISTOR	
D201M	B2ZBZ0000027	THYRISTOR	
D201N	B2ZBZ0000027	THYRISTOR	
D201O	B2ZBZ0000027	THYRISTOR	
D201P	B2ZBZ0000027	THYRISTOR	
D201Q	B2ZBZ0000027	THYRISTOR	
D201R	B2ZBZ0000027	THYRISTOR	
D201S	B2ZBZ0000027	THYRISTOR	
D201T	B2ZBZ0000027	THYRISTOR	
D201U	B2ZBZ0000027	THYRISTOR	
D201V	B2ZBZ0000027	THYRISTOR	
D201W	B2ZBZ0000027	THYRISTOR	
D201X	B2ZBZ0000027	THYRISTOR	
D251A	MA110	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D252	MA110	DIODE(SI)	S
D801	MAZ31500ML	DIODE(SI)	
D802	MAZ32000ML	DIODE(SI)	
D803	B0HCMR000002	DIODE(SI)	
D804	B0HCMR000002	DIODE(SI)	
D805	MAZ32400HL	DIODE(SI)	
D806	B0HCMR000002	DIODE(SI)	
D807	B0HCQL000001	DIODE(SI)	
D808	MAZ31500ML	DIODE(SI)	
D809	MA729	DIODE(SI)	S
D810	MA729	DIODE(SI)	S
D811	B0HCMR000002	DIODE(SI)	
D813	MAZ32400ML	DIODE(SI)	
D814	B0HCQL000001	DIODE(SI)	
D815	MAZ32000ML	DIODE(SI)	
DA1	MA142WKTX	DIODE(SI)	S
DA200A	B0ADDM000002	DIODE(SI)	
DA200B	B0ADDM000002	DIODE(SI)	
DA200C	B0ADDM000002	DIODE(SI)	
DA200D	B0ADDM000002	DIODE(SI)	
DA200E	B0ADDM000002	DIODE(SI)	
DA200F	B0ADDM000002	DIODE(SI)	
DA200G	B0ADDM000002	DIODE(SI)	
DA200H	B0ADDM000002	DIODE(SI)	
DA200I	B0ADDM000002	DIODE(SI)	
DA200J	B0ADDM000002	DIODE(SI)	
DA200K	B0ADDM000002	DIODE(SI)	
DA200L	B0ADDM000002	DIODE(SI)	
DA200M	B0ADDM000002	DIODE(SI)	
DA200N	B0ADDM000002	DIODE(SI)	
DA200O	B0ADDM000002	DIODE(SI)	
DA200P	B0ADDM000002	DIODE(SI)	
DA200Q	B0ADDM000002	DIODE(SI)	
DA200R	B0ADDM000002	DIODE(SI)	
DA200S	B0ADDM000002	DIODE(SI)	
DA200T	B0ADDM000002	DIODE(SI)	
DA200U	B0ADDM000002	DIODE(SI)	
DA200V	B0ADDM000002	DIODE(SI)	
DA200W	B0ADDM000002	DIODE(SI)	
DA200X	B0ADDM000002	DIODE(SI)	
LED1	PQVDBRPY1204	LED	S
		(CONNECTORS)	
CN1	K1KA90B00009	CONNECTOR, 90P	
CN200	K1FB150B0046	CONNECTOR, 150P	
		(COMPONENTS PARTS)	
RA1	D1H81034A024	RESISTOR ARRAY, 10k	
RA2	D1H81034A024	RESISTOR ARRAY, 10k	
RA3	D1H81034A024	RESISTOR ARRAY, 10k	
RA4	D1H81034A024	RESISTOR ARRAY, 10k	
RA5	D1H81034A024	RESISTOR ARRAY, 10k	
RA6	D1H81034A024	RESISTOR ARRAY, 10k	
RA7	D1H81034A024	RESISTOR ARRAY, 10k	
RA8	D1H81034A024	RESISTOR ARRAY, 10k	
RA9	D1H81034A024	RESISTOR ARRAY, 10k	
RA10	D1H81034A024	RESISTOR ARRAY, 10k	
RA11	D1H81034A024	RESISTOR ARRAY, 10k	
RA12	D1H81024A024	RESISTOR ARRAY, 1k	
RA13	D1H81034A024	RESISTOR ARRAY, 10k	
RA14	D1H81014A024	RESISTOR ARRAY, 100	
RA22	D1H84704A024	RESISTOR ARRAY, 47	
RA24	D1H81034A024	RESISTOR ARRAY, 10k	
RA25	D1H84704A024	RESISTOR ARRAY, 47	
RA26	D1H84704A024	RESISTOR ARRAY, 47	
RA27	D1H84704A024	RESISTOR ARRAY, 47	
RA28	D1H84704A024	RESISTOR ARRAY, 47	
RA29	D1H84704A024	RESISTOR ARRAY, 47	
RA30	D1H84704A024	RESISTOR ARRAY, 47	
RA31	D1H81034A024	RESISTOR ARRAY, 10k	
RA32	D1H81034A024	RESISTOR ARRAY, 10k	
RA33	D1H84704A024	RESISTOR ARRAY, 47	
RA50	D1H81014A024	RESISTOR ARRAY, 100	

Ref. No.	Part No.	Part Name & Description	Remarks
RA51	D1H81014A024	RESISTOR ARRAY, 100	
RA53	D1H81024A024	RESISTOR ARRAY, 1k	
RA54	D1H81014A024	RESISTOR ARRAY, 100	
RA55	D1H81014A024	RESISTOR ARRAY, 100	
RA56	D1H81024A024	RESISTOR ARRAY, 1k	
RA57	D1H84724A024	RESISTOR ARRAY, 4.7k	
RA58	D1H81014A024	RESISTOR ARRAY, 100	
RA59	D1H81014A024	RESISTOR ARRAY, 100	
RA60	D1H81024A024	RESISTOR ARRAY, 1k	
RA601	D1H81034A024	RESISTOR ARRAY, 10k	
RA602	D1H81034A024	RESISTOR ARRAY, 10k	
RA603	D1H81034A024	RESISTOR ARRAY, 10k	
RA604	D1H81034A024	RESISTOR ARRAY, 10k	
RA605	D1H86804A024	RESISTOR ARRAY, 68	
RA606	D1H86804A024	RESISTOR ARRAY, 68	
RA607	D1H86804A024	RESISTOR ARRAY, 68	
RA608	D1H86804A024	RESISTOR ARRAY, 68	
RA609	D1H81034A024	RESISTOR ARRAY, 10k	
RA610	D1H81024A024	RESISTOR ARRAY, 1k	
RA611	D1H81024A024	RESISTOR ARRAY, 1k	
RA612	D1H81024A024	RESISTOR ARRAY, 1k	
RA613	D1H81024A024	RESISTOR ARRAY, 1k	
RA614	D1H81034A024	RESISTOR ARRAY, 10k	
RA615	D1H81034A024	RESISTOR ARRAY, 10k	
RA616	D1H81034A024	RESISTOR ARRAY, 10k	
RA617	D1H81034A024	RESISTOR ARRAY, 10k	
RA618	D1H81034A024	RESISTOR ARRAY, 10k	
RA619	D1H81034A024	RESISTOR ARRAY, 10k	
RA620	D1H81034A024	RESISTOR ARRAY, 10k	
RA621	D1H81014A024	RESISTOR ARRAY, 100	
RA622	D1H81034A024	RESISTOR ARRAY, 10k	
RA623	D1H86804A024	RESISTOR ARRAY, 68	
RA624	D1H86804A024	RESISTOR ARRAY, 68	
RA625	D1H86804A024	RESISTOR ARRAY, 68	
RA626	D1H86804A024	RESISTOR ARRAY, 68	
RA627	D1H86804A024	RESISTOR ARRAY, 68	
RA628	D1H81034A024	RESISTOR ARRAY, 10k	
		(COIL)	
L1	G1A220G00006	COIL	
		(CRYSTAL OSCILLATOR)	
X1	H0J163500009	CRYSTAL OSCILLATOR	
X601	H2C122500003	CRYSTAL OSCILLATOR	
		(FILTERS)	
FIL1	F1J1C105A187	IC FILTER	
FIL2	F1J1C105A187	IC FILTER	
FLT603	F1J1C105A187	IC FILTER	
L2	PFVF2P600SG	CERAMIC FILTER	S
L5	J0JCC0000275	IC FILTER	
L102	J0JCC0000275	IC FILTER	
L103	J0JCC0000275	IC FILTER	
L104	J0JCC0000275	IC FILTER	
L601	J0JCC0000275	IC FILTER	
L602	J0JCC0000275	IC FILTER	
L603	J0JCC0000275	IC FILTER	
L802	PFVF2P600SG	CERAMIC FILTER	S
LA10	J0JAD0000036	IC FILTER	
LA11	J0JAD0000036	IC FILTER	
LA12	J0JAD0000036	IC FILTER	
LA13	J0JAD0000036	IC FILTER	
LA14	J0JAD0000036	IC FILTER	
LA15	J0JAD0000036	IC FILTER	
LA601	J0JAD0000036	IC FILTER	
LA602	J0JAD0000036	IC FILTER	
LA603	J0JAD0000036	IC FILTER	
LA604	J0JAD0000036	IC FILTER	
LA605	J0JAD0000036	IC FILTER	
LA606	J0JAD0000036	IC FILTER	
LA607	J0JAD0000036	IC FILTER	
LA608	J0JAD0000036	IC FILTER	
LA609	J0JAD0000036	IC FILTER	

Ref. No.	Part No.	Part Name & Description	Remarks
		(FUSES)	
IP1	K5H352A00003	FUSE	
IP2	K5H302A00006	FUSE	
		(JACKS)	
CN201	K2LB1YYB0004	JACK, MODULAR	
CN202	K2LB1YYB0004	JACK, MODULAR	
		(THERMISTOR)	
TH801	D4CA94R0A001	THERMISTOR	
		(TRANSFORMERS)	
T801	G4DYA0000129	TRANSFORMER	
T802	G4DYA0000130	TRANSFORMER	
T803	G4DYA0000128	TRANSFORMER	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC801	B3PBA0000297	PHOTO COUPER	
PC802	B3PBA0000297	PHOTO COUPER	
PC803	B3PBA0000297	PHOTO COUPER	
		(RELAYS)	
RL200A	K6B2CGA00121	RELAY	
RL200B	K6B2CGA00121	RELAY	
RL200C	K6B2CGA00121	RELAY	
RL200D	K6B2CGA00121	RELAY	
RL201A	K6B2CGA00094	RELAY	
		(CAPACITORS)	
C1	ECJ1VB1H104K	0.1	
C2	ECJ3YX1H105K	1	
C3	ECJ1VB1H104K	0.1	
C4	ECJ1VB1H104K	0.1	
C5	ECJ3YX1H105K	1	
C7	EEVUD1E151MP	150	
C8	EEVUD1E151MP	150	
C9	ECJ1VB1H104K	0.1	
C10	F2G0J102A060	1000	
C12	ECJ1VB1H104K	0.1	
C30	F1G1H180A565	18p	
C31	F1G1H180A565	18p	
C32	F1G1A1040006	0.1	
C33	ECUV1A105ZFV	1	
C34	F1G1H103A573	0.01	
C35	ECUV1A105ZFV	1	
C36	F1G1H103A573	0.01	
C37	F1G1H103A573	0.01	
C38	F1G1H103A573	0.01	
C39	F1G1H103A573	0.01	
C40	F1G1H103A573	0.01	
C41	F1G1H103A573	0.01	
C42	F1G1H103A573	0.01	
C43	F1G1H103A573	0.01	
C44	F1G1H103A573	0.01	
C45	F1G1H103A573	0.01	
C46	F1G1H103A573	0.01	
C47	F1G1H103A573	0.01	
C48	F1G1H103A573	0.01	
C49	F1G1H103A573	0.01	
C50	F1G1H103A573	0.01	
C51	F1G1H103A573	0.01	
C52	F1G1A1040006	0.1	
C53	F1G1A1040006	0.1	
C54	F1G1A1040006	0.1	
C56	F1G1H3320004	0.0033	
C57	F1G1H103A573	0.01	
C100	ECUV1A105ZFV	1	
C101	ECUV1A105ZFV	1	
C102	F1G1H103A573	0.01	
C103	F1G1H103A573	0.01	
C104	F1G1H103A573	0.01	
C105	F1G1H103A573	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C106	F1G1H103A573	0.01	
C107	F1G1H103A573	0.01	
C108	ECUV1C104ZFV	0.1	
C109	ECUV1C104ZFV	0.1	
C110	PQCUV1C225ZF	2.2	
C111	PQCUV1C225ZF	2.2	
C112	ECJ1VF1C105Z	1	
C113	ECJ1VF1C105Z	1	
C114	F1G1H103A573	0.01	
C115	F1G1H103A573	0.01	
C116	F1G1H103A573	0.01	
C117	F1G1H103A573	0.01	
C118	F1G1H103A573	0.01	
C119	F1G1H103A573	0.01	
C120	F1G1H103A573	0.01	
C121	F1G1H103A573	0.01	
C122	F1G1H103A573	0.01	
C123	F1G1H103A573	0.01	
C124	F1G1H103A573	0.01	
C125	F1G1H103A573	0.01	
C126	F1G1H103A573	0.01	
C127	F1G1H103A573	0.01	
C128	F1G1H103A573	0.01	
C134	F1G1H103A573	0.01	
C135	F1G1H103A573	0.01	
C136	F1G1H103A573	0.01	
C137	F1G1H103A573	0.01	
C138	F1G1H103A573	0.01	
C139	F1G1H103A573	0.01	
C140	F1G1H103A573	0.01	
C141	F1G1H103A573	0.01	
C142	F1G1H103A573	0.01	
C143	ECUV1A105ZFV	1	
C144	F1G1H221A541	220	
C145	F1G1H221A541	220	
C146	F1G1H221A541	220	
C147	F1G1H221A541	220	
C148	F1G1H221A541	220	
C149	F1G1H221A541	220	
C150	F1G1H221A541	220	
C151	F1G1H221A541	220	
C152	F1G1H221A541	220	
C153	F1G1H221A541	220	
C154	F1G1H221A541	220	
C155	F1G1H221A541	220	
C156	F1G1H221A541	220	
C157	F1G1H221A541	220	
C158	F1G1H221A541	220	
C164	ECUV1A105ZFV	1	
C165	ECUV1A105ZFV	1	
C166	F1G1H103A573	0.01	
C167	F1G1H103A573	0.01	
C169	F1G1H103A573	0.01	
C171	F1G1H103A573	0.01	
C172	ECUV1A105ZFV	1	
C173	F1G1H103A573	0.01	
C200A	F1K2E3330002	0.033	
C200B	F1K2E3330002	0.033	
C200C	F1K2E3330002	0.033	
C200D	F1K2E3330002	0.033	
C200E	F1K2E3330002	0.033	
C200F	F1K2E3330002	0.033	
C200G	F1K2E3330002	0.033	
C200H	F1K2E3330002	0.033	
C200I	F1K2E3330002	0.033	
C200J	F1K2E3330002	0.033	
C200K	F1K2E3330002	0.033	
C200L	F1K2E3330002	0.033	
C200M	F1K2E3330002	0.033	
C200N	F1K2E3330002	0.033	
C200O	F1K2E3330002	0.033	
C200P	F1K2E3330002	0.033	
C200Q	F1K2E3330002	0.033	

Ref. No.	Part No.	Part Name & Description	Remarks
C200R	F1K2E3330002	0.033	
C200S	F1K2E3330002	0.033	
C200T	F1K2E3330002	0.033	
C200U	F1K2E3330002	0.033	
C200V	F1K2E3330002	0.033	
C200W	F1K2E3330002	0.033	
C200X	F1K2E3330002	0.033	
C201A	F1K2E3330002	0.033	
C201B	F1K2E3330002	0.033	
C201C	F1K2E3330002	0.033	
C201D	F1K2E3330002	0.033	
C201E	F1K2E3330002	0.033	
C201F	F1K2E3330002	0.033	
C201G	F1K2E3330002	0.033	
C201H	F1K2E3330002	0.033	
C201I	F1K2E3330002	0.033	
C201J	F1K2E3330002	0.033	
C201K	F1K2E3330002	0.033	
C201L	F1K2E3330002	0.033	
C201M	F1K2E3330002	0.033	
C201N	F1K2E3330002	0.033	
C201O	F1K2E3330002	0.033	
C201P	F1K2E3330002	0.033	
C201Q	F1K2E3330002	0.033	
C201R	F1K2E3330002	0.033	
C201S	F1K2E3330002	0.033	
C201T	F1K2E3330002	0.033	
C201U	F1K2E3330002	0.033	
C201V	F1K2E3330002	0.033	
C201W	F1K2E3330002	0.033	
C201X	F1K2E3330002	0.033	
C202A	F1G1C104A085	0.1	
C202B	F1G1C104A085	0.1	
C202C	F1G1C104A085	0.1	
C202D	F1G1C104A085	0.1	
C202E	F1G1C104A085	0.1	
C202F	F1G1C104A085	0.1	
C202G	F1G1C104A085	0.1	
C202H	F1G1C104A085	0.1	
C202I	F1G1C104A085	0.1	
C202J	F1G1C104A085	0.1	
C202K	F1G1C104A085	0.1	
C202L	F1G1C104A085	0.1	
C202M	F1G1C104A085	0.1	
C202N	F1G1C104A085	0.1	
C202O	F1G1C104A085	0.1	
C202P	F1G1C104A085	0.1	
C202Q	F1G1C104A085	0.1	
C202R	F1G1C104A085	0.1	
C202S	F1G1C104A085	0.1	
C202T	F1G1C104A085	0.1	
C202U	F1G1C104A085	0.1	
C202V	F1G1C104A085	0.1	
C202W	F1G1C104A085	0.1	
C202X	F1G1C104A085	0.1	
C203A	ECJ1VB1H104K	0.1	
C203B	ECJ1VB1H104K	0.1	
C203C	ECJ1VB1H104K	0.1	
C203D	ECJ1VB1H104K	0.1	
C203E	ECJ1VB1H104K	0.1	
C203F	ECJ1VB1H104K	0.1	
C203G	ECJ1VB1H104K	0.1	
C203H	ECJ1VB1H104K	0.1	
C203I	ECJ1VB1H104K	0.1	
C203J	ECJ1VB1H104K	0.1	
C203K	ECJ1VB1H104K	0.1	
C203L	ECJ1VB1H104K	0.1	
C203M	ECJ1VB1H104K	0.1	
C203N	ECJ1VB1H104K	0.1	
C203O	ECJ1VB1H104K	0.1	
C203P	ECJ1VB1H104K	0.1	
C203Q	ECJ1VB1H104K	0.1	
C203R	ECJ1VB1H104K	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C203S	ECJ1VB1H104K	0.1	
C203T	ECJ1VB1H104K	0.1	
C203U	ECJ1VB1H104K	0.1	
C203V	ECJ1VB1H104K	0.1	
C203W	ECJ1VB1H104K	0.1	
C203X	ECJ1VB1H104K	0.1	
C206A	ECJ1V90J475K	4.7	
C206B	ECJ1V90J475K	4.7	
C206C	ECJ1V90J475K	4.7	
C206D	ECJ1V90J475K	4.7	
C206E	ECJ1V90J475K	4.7	
C206F	ECJ1V90J475K	4.7	
C206G	ECJ1V90J475K	4.7	
C206H	ECJ1V90J475K	4.7	
C206I	ECJ1V90J475K	4.7	
C206J	ECJ1V90J475K	4.7	
C206K	ECJ1V90J475K	4.7	
C206L	ECJ1V90J475K	4.7	
C206M	ECJ1V90J475K	4.7	
C206N	ECJ1V90J475K	4.7	
C206O	ECJ1V90J475K	4.7	
C206P	ECJ1V90J475K	4.7	
C206Q	ECJ1V90J475K	4.7	
C206R	ECJ1V90J475K	4.7	
C206S	ECJ1V90J475K	4.7	
C206T	ECJ1V90J475K	4.7	
C206U	ECJ1V90J475K	4.7	
C206V	ECJ1V90J475K	4.7	
C206W	ECJ1V90J475K	4.7	
C206X	ECJ1V90J475K	4.7	
C207A	F1H1A684A076	0.68	
C207B	F1H1A684A076	0.68	
C207C	F1H1A684A076	0.68	
C207D	F1H1A684A076	0.68	
C207E	F1H1A684A076	0.68	
C207F	F1H1A684A076	0.68	
C207G	F1H1A684A076	0.68	
C207H	F1H1A684A076	0.68	
C207I	F1H1A684A076	0.68	
C207J	F1H1A684A076	0.68	
C207K	F1H1A684A076	0.68	
C207L	F1H1A684A076	0.68	
C207M	F1H1A684A076	0.68	
C207N	F1H1A684A076	0.68	
C207O	F1H1A684A076	0.68	
C207P	F1H1A684A076	0.68	
C207Q	F1H1A684A076	0.68	
C207R	F1H1A684A076	0.68	
C207S	F1H1A684A076	0.68	
C207T	F1H1A684A076	0.68	
C207U	F1H1A684A076	0.68	
C207V	F1H1A684A076	0.68	
C207W	F1H1A684A076	0.68	
C207X	F1H1A684A076	0.68	
C208A	F1H1A684A076	0.68	
C208B	F1H1A684A076	0.68	
C208C	F1H1A684A076	0.68	
C208D	F1H1A684A076	0.68	
C208E	F1H1A684A076	0.68	
C208F	F1H1A684A076	0.68	
C208G	F1H1A684A076	0.68	
C208H	F1H1A684A076	0.68	
C208I	F1H1A684A076	0.68	
C208J	F1H1A684A076	0.68	
C208K	F1H1A684A076	0.68	
C208L	F1H1A684A076	0.68	
C208M	F1H1A684A076	0.68	
C208N	F1H1A684A076	0.68	
C208O	F1H1A684A076	0.68	
C208P	F1H1A684A076	0.68	
C208Q	F1H1A684A076	0.68	
C208R	F1H1A684A076	0.68	
C208S	F1H1A684A076	0.68	

Ref. No.	Part No.	Part Name & Description	Remarks
C208T	F1H1A684A076	0.68	
C208U	F1H1A684A076	0.68	
C208V	F1H1A684A076	0.68	
C208W	F1H1A684A076	0.68	
C208X	F1H1A684A076	0.68	
C210A	F1H1A124A033	0.12	
C210B	F1H1A124A033	0.12	
C210C	F1H1A124A033	0.12	
C210D	F1H1A124A033	0.12	
C210E	F1H1A124A033	0.12	
C210F	F1H1A124A033	0.12	
C210G	F1H1A124A033	0.12	
C210H	F1H1A124A033	0.12	
C210I	F1H1A124A033	0.12	
C210J	F1H1A124A033	0.12	
C210K	F1H1A124A033	0.12	
C210L	F1H1A124A033	0.12	
C210M	F1H1A124A033	0.12	
C210N	F1H1A124A033	0.12	
C210O	F1H1A124A033	0.12	
C210P	F1H1A124A033	0.12	
C210Q	F1H1A124A033	0.12	
C210R	F1H1A124A033	0.12	
C210S	F1H1A124A033	0.12	
C210T	F1H1A124A033	0.12	
C210U	F1H1A124A033	0.12	
C210V	F1H1A124A033	0.12	
C210W	F1H1A124A033	0.12	
C210X	F1H1A124A033	0.12	
C211A	F1G1C104A085	0.1	
C211B	F1G1C104A085	0.1	
C211C	F1G1C104A085	0.1	
C211D	F1G1C104A085	0.1	
C211E	F1G1C104A085	0.1	
C211F	F1G1C104A085	0.1	
C211G	F1G1C104A085	0.1	
C211H	F1G1C104A085	0.1	
C211I	F1G1C104A085	0.1	
C211J	F1G1C104A085	0.1	
C211K	F1G1C104A085	0.1	
C211L	F1G1C104A085	0.1	
C211M	F1G1C104A085	0.1	
C211N	F1G1C104A085	0.1	
C211O	F1G1C104A085	0.1	
C211P	F1G1C104A085	0.1	
C211Q	F1G1C104A085	0.1	
C211R	F1G1C104A085	0.1	
C211S	F1G1C104A085	0.1	
C211T	F1G1C104A085	0.1	
C211U	F1G1C104A085	0.1	
C211V	F1G1C104A085	0.1	
C211W	F1G1C104A085	0.1	
C211X	F1G1C104A085	0.1	
C220A	F1K2E1040004	0.1	
C220C	F1K2E1040004	0.1	
C220E	F1K2E1040004	0.1	
C220G	F1K2E1040004	0.1	
C220I	F1K2E1040004	0.1	
C220K	F1K2E1040004	0.1	
C220M	F1K2E1040004	0.1	
C220O	F1K2E1040004	0.1	
C220Q	F1K2E1040004	0.1	
C220S	F1K2E1040004	0.1	
C220U	F1K2E1040004	0.1	
C220W	F1K2E1040004	0.1	
C221A	F1K2E1040004	0.1	
C221C	F1K2E1040004	0.1	
C221E	F1K2E1040004	0.1	
C221G	F1K2E1040004	0.1	
C221I	F1K2E1040004	0.1	
C221K	F1K2E1040004	0.1	
C221M	F1K2E1040004	0.1	
C221O	F1K2E1040004	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C221Q	F1K2E1040004	0.1	
C221S	F1K2E1040004	0.1	
C221U	F1K2E1040004	0.1	
C221W	F1K2E1040004	0.1	
C222A	F1K2E1040004	0.1	
C222C	F1K2E1040004	0.1	
C222E	F1K2E1040004	0.1	
C222G	F1K2E1040004	0.1	
C222I	F1K2E1040004	0.1	
C222K	F1K2E1040004	0.1	
C222M	F1K2E1040004	0.1	
C222O	F1K2E1040004	0.1	
C222Q	F1K2E1040004	0.1	
C222S	F1K2E1040004	0.1	
C222U	F1K2E1040004	0.1	
C222W	F1K2E1040004	0.1	
C225A	F1G1C104A085	0.1	
C225C	F1G1C104A085	0.1	
C225E	F1G1C104A085	0.1	
C225G	F1G1C104A085	0.1	
C225I	F1G1C104A085	0.1	
C225K	F1G1C104A085	0.1	
C225M	F1G1C104A085	0.1	
C225O	F1G1C104A085	0.1	
C225Q	F1G1C104A085	0.1	
C225S	F1G1C104A085	0.1	
C225U	F1G1C104A085	0.1	
C225W	F1G1C104A085	0.1	
C226A	ECJ1VB1E683K	0.068	
C226C	ECJ1VB1E683K	0.068	
C226E	ECJ1VB1E683K	0.068	
C226G	ECJ1VB1E683K	0.068	
C226I	ECJ1VB1E683K	0.068	
C226K	ECJ1VB1E683K	0.068	
C226M	ECJ1VB1E683K	0.068	
C226O	ECJ1VB1E683K	0.068	
C226Q	ECJ1VB1E683K	0.068	
C226S	ECJ1VB1E683K	0.068	
C226U	ECJ1VB1E683K	0.068	
C226W	ECJ1VB1E683K	0.068	
C227A	F1G1C104A085	0.1	
C227C	F1G1C104A085	0.1	
C227E	F1G1C104A085	0.1	
C227G	F1G1C104A085	0.1	
C227I	F1G1C104A085	0.1	
C227K	F1G1C104A085	0.1	
C227M	F1G1C104A085	0.1	
C227O	F1G1C104A085	0.1	
C227Q	F1G1C104A085	0.1	
C227S	F1G1C104A085	0.1	
C227U	F1G1C104A085	0.1	
C227W	F1G1C104A085	0.1	
C228A	ECJ1V90J475K	4.7	
C228C	ECJ1V90J475K	4.7	
C228E	ECJ1V90J475K	4.7	
C228G	ECJ1V90J475K	4.7	
C228I	ECJ1V90J475K	4.7	
C228K	ECJ1V90J475K	4.7	
C228M	ECJ1V90J475K	4.7	
C228O	ECJ1V90J475K	4.7	
C228Q	ECJ1V90J475K	4.7	
C228S	ECJ1V90J475K	4.7	
C228U	ECJ1V90J475K	4.7	
C228W	ECJ1V90J475K	4.7	
C229A	F1G1C104A085	0.1	
C229C	F1G1C104A085	0.1	
C229E	F1G1C104A085	0.1	
C229G	F1G1C104A085	0.1	
C229I	F1G1C104A085	0.1	
C229K	F1G1C104A085	0.1	
C229M	F1G1C104A085	0.1	
C229O	F1G1C104A085	0.1	
C229Q	F1G1C104A085	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C229S	F1G1C104A085	0.1	
C229U	F1G1C104A085	0.1	
C229W	F1G1C104A085	0.1	
C601	ECUV1A105ZFV	1	
C603	F1G1H103A573	0.01	
C604	ECUV1A105ZFV	1	
C605	F1G1H103A573	0.01	
C608	F1G1H103A573	0.01	
C609	F1G1H103A573	0.01	
C610	F1G1H103A573	0.01	
C611	F1G1H103A573	0.01	
C612	F1G1H103A573	0.01	
C613	F1G1H103A573	0.01	
C614	F1G1H103A573	0.01	
C615	F1G1H103A573	0.01	
C616	F1G1H103A573	0.01	
C617	F1G1H103A573	0.01	
C618	F1G1H103A573	0.01	
C619	F1G1H103A573	0.01	
C620	F1G1H103A573	0.01	
C621	F1G1H103A573	0.01	
C622	F1G1H103A573	0.01	
C623	F1G1H103A573	0.01	
C624	F1G1H103A573	0.01	
C625	F1G1H103A573	0.01	
C626	F1G1H103A573	0.01	
C627	F1G1H103A573	0.01	
C628	F1G1H221A541	220	
C629	F1G1H221A541	220	
C630	F1G1H221A541	220	
C631	F1G1H221A541	220	
C632	F1G1H221A541	220	
C633	F1G1H221A541	220	
C634	F1G1H221A541	220	
C635	F1G1H221A541	220	
C636	F1G1H221A541	220	
C637	F1G1H221A541	220	
C638	F1G1H221A541	220	
C639	F1G1H221A541	220	
C640	F1G1H221A541	220	
C641	F1G1H221A541	220	
C642	F1G1H221A541	220	
C643	F1G1H221A541	220	
C644	F1G1H221A541	220	
C645	F1G1H221A541	220	
C646	F1G1H221A541	220	
C647	F1G1H221A541	220	
C648	F1G1H103A573	0.01	
C649	ECUV1A105ZFV	1	
C650	F1G1H103A573	0.01	
C651	F1G1H103A573	0.01	
C652	F1G1H103A573	0.01	
C653	F1G1H103A573	0.01	
C654	F1G1H103A573	0.01	
C655	F1G1H103A573	0.01	
C656	ECUV1A105ZFV	1	
C801	ECJ1VB1H104K	0.1	
C802	ECJ1VB1H104K	0.1	
C803	ECJ3YX1H105K	1	
C804	ECJ1VB1H104K	0.1	
C805	F1L2E474A021	0.47	
C806	ECJ1VB1H473K	0.047	
C807	ECJ1VC1H471J	470p	
C808	ECJ1VB1H104K	0.1	
C809	ECJ1VB1H104K	0.1	
C810	ECJ1VB1H104K	0.1	
C811	ECJ1VB1H104K	0.1	
C812	ECJ1VB1H473K	0.047	
C813	ECJ1VC1H471J	470p	
C814	ECJ1VB1H104K	0.1	
C815	ECJ1VB1H104K	0.1	
C816	F2A1J1810011	180	
C817	F2A1J1810011	180	

Ref. No.	Part No.	Part Name & Description	Remarks
C821	F2A2A4700022	47	
C823	ECJ1VB1H104K	0.1	
C824	ECJ1VB1H104K	0.1	
C826	F2A1H2210020	220	
C827	ECJ1VB1H104K	0.1	
C828	ECJ1VB1H104K	0.1	
C830	F1A2H221A086	220	
C831	F2G1H4700027	47	
C833	F1L2E474A021	0.47	
C834	F2G0J2210016	220	
C841	ECJ1VB1H104K	0.1	
C842	ECJ1VB1H473K	0.047	
C843	ECJ1VC1H471J	470p	
C844	ECJ1VB1H104K	0.1	
C845	ECJ1VB1H104K	0.1	
C848	F2A1H2210020	220	
C849	F1A2H101A086	100	
C850	ECJ1VB1H104K	0.1	
C851	ECJ1VB1H104K	0.1	
C854	ECJ1VB1H102K	0.001	
		(RESISTORS)	
J1	PQ4R18XJ000	0	S
J6	ERJ2GEJ000	0	S
J7	ERJ2GEJ000	0	S
J8	ERJ2GEJ000	0	S
J9	ERJ2GEJ000	0	S
J10	ERJ2GEJ000	0	S
J11	ERJ2GEJ000	0	S
J12	ERJ2GEJ000	0	S
J13	ERJ2GEJ000	0	S
J17	ERJ2GEJ000	0	S
J19	PQ4R18XJ000	0	S
J20	PQ4R18XJ000	0	S
J21	PQ4R18XJ000	0	S
J22	ERJ2GEJ000	0	S
J24	ERJ2GEJ000	0	S
J25	ERJ2GEJ000	0	S
J30	ERJ2GEJ000	0	S
J34	ERJ2GEJ000	0	S
J35	ERJ2GEJ000	0	S
J45	PQ4R18XJ000	0	S
J46	PQ4R18XJ000	0	S
J250	PQ4R18XJ000	0	S
J251	PQ4R18XJ000	0	S
J602	ERJ2GEJ000	0	S
J603	ERJ2GEJ000	0	S
J604	ERJ2GEJ000	0	S
J605	ERJ2GEJ000	0	S
J607	ERJ2GEJ000	0	S
J609	ERJ2GEJ000	0	S
J610	ERJ2GEJ000	0	S
J801	PQ4R10XJ000	0	S
J803	PQ4R10XJ000	0	S
J804	PQ4R10XJ000	0	S
J805	PQ4R10XJ000	0	S
J806	ERJ3GEY0R00	0	
J807	PQ4R18XJ000	0	S
J810	PQ4R18XJ000	0	S
J812	PQ4R18XJ000	0	S
L100	ERJ3GEY0R00	0	
L101	ERJ3GEY0R00	0	
R1	ERX1SJR47E	0.47	
R2	ERX1SJR82	0.82	
R3	PQ4R10XJ331	330	S
R4	ERJ3GEYJ562	5.6k	
R5	ERJ3GEYJ103	10k	
R6	ERJ3GEYJ102	1k	
R7	ERJ3GEYJ102	1k	
R10	ERJ3GEYJ473	47k	
R11	ERJ3GEYJ103	10k	
R12	PQ4R10XJ222	2.2k	S
R13	ERJ3GEYJ473	47k	

Ref. No.	Part No.	Part Name & Description	Remarks
R14	ERJ3GEYJ333	33k	
R15	ERJ3GEYJ103	10k	
R20	ERJ6GEY0R00	0	
R21	PQ4R10XJ153	15k	S
R22	ERJP08J560	56	
R23	ERJ3GEYJ223	22k	
R24	ERJ3EKF2742	27.4k	
R25	ERJ3EKF1002	10k	
R40	ERJ2GEYJ151	150	S
R41	ERJ2GEYJ151	150	S
R42	ERJ2GEJ105X	1M	S
R43	D0GA272JA021	2.7k	
R44	ERJ2GEYJ103	10k	S
R45	ERJ2GEJ221	220	S
R46	ERJ2GEYJ102	1k	S
R47	ERJ2GEYJ103	10k	S
R48	ERJ2GEYJ103	10k	S
R49	ERJ2GEYJ103	10k	S
R50	ERJ2GEJ101	100	S
R51	ERJ2GEJ220	22	S
R52	ERJ2GEJ220	22	S
R53	ERJ2GEJ221	220	S
R54	ERJ2GEYJ102	1k	S
R55	ERJ2GEJ220	22	S
R57	ERJ2GEJ220	22	S
R58	ERJ2GEJ220	22	S
R100	ERJ2GEJ101	100	S
R101	ERJ2GEJ101	100	S
R102	ERJ2GEJ472X	4.7k	S
R103	ERJ2GEJ680	68	S
R104	ERJ2GEJ101	100	S
R105	ERJ2GEJ472X	4.7k	S
R106	ERJ2GEJ101	100	S
R107	ERJ2GEJ101	100	S
R108	ERJ2GEJ101	100	S
R109	ERJ2GEJ101	100	S
R110	ERJ2GEJ472X	4.7k	S
R111	D0GA331JA021	330	
R112	ERJ2GEJ101	100	S
R113	ERJ2GEJ101	100	S
R114	ERJ2GEJ330	33	S
R115	ERJ2GEJ101	100	S
R116	ERJ2GEJ101	100	S
R127	ERJ2GEYJ103	10k	S
R128	ERJ2GEJ101	100	S
R129	ERJ2GEJ101	100	S
R200A	ERJ12YJ300	30	
R200B	ERJ12YJ300	30	
R200C	ERJ12YJ300	30	
R200D	ERJ12YJ300	30	
R200E	ERJ12YJ300	30	
R200F	ERJ12YJ300	30	
R200G	ERJ12YJ300	30	
R200H	ERJ12YJ300	30	
R200I	ERJ12YJ300	30	
R200J	ERJ12YJ300	30	
R200K	ERJ12YJ300	30	
R200L	ERJ12YJ300	30	
R200M	ERJ12YJ300	30	
R200N	ERJ12YJ300	30	
R200O	ERJ12YJ300	30	
R200P	ERJ12YJ300	30	
R200Q	ERJ12YJ300	30	
R200R	ERJ12YJ300	30	
R200S	ERJ12YJ300	30	
R200T	ERJ12YJ300	30	
R200U	ERJ12YJ300	30	
R200V	ERJ12YJ300	30	
R200W	ERJ12YJ300	30	
R200X	ERJ12YJ300	30	
R201A	ERJ12YJ300	30	
R201B	ERJ12YJ300	30	
R201C	ERJ12YJ300	30	

Ref. No.	Part No.	Part Name & Description	Remarks
R201D	ERJ12YJ300	30	
R201E	ERJ12YJ300	30	
R201F	ERJ12YJ300	30	
R201G	ERJ12YJ300	30	
R201H	ERJ12YJ300	30	
R201I	ERJ12YJ300	30	
R201J	ERJ12YJ300	30	
R201K	ERJ12YJ300	30	
R201L	ERJ12YJ300	30	
R201M	ERJ12YJ300	30	
R201N	ERJ12YJ300	30	
R201O	ERJ12YJ300	30	
R201P	ERJ12YJ300	30	
R201Q	ERJ12YJ300	30	
R201R	ERJ12YJ300	30	
R201S	ERJ12YJ300	30	
R201T	ERJ12YJ300	30	
R201U	ERJ12YJ300	30	
R201V	ERJ12YJ300	30	
R201W	ERJ12YJ300	30	
R201X	ERJ12YJ300	30	
R202A	ERJ12YJ300	30	
R202B	ERJ12YJ300	30	
R202C	ERJ12YJ300	30	
R202D	ERJ12YJ300	30	
R202E	ERJ12YJ300	30	
R202F	ERJ12YJ300	30	
R202G	ERJ12YJ300	30	
R202H	ERJ12YJ300	30	
R202I	ERJ12YJ300	30	
R202J	ERJ12YJ300	30	
R202K	ERJ12YJ300	30	
R202L	ERJ12YJ300	30	
R202M	ERJ12YJ300	30	
R202N	ERJ12YJ300	30	
R202O	ERJ12YJ300	30	
R202P	ERJ12YJ300	30	
R202Q	ERJ12YJ300	30	
R202R	ERJ12YJ300	30	
R202S	ERJ12YJ300	30	
R202T	ERJ12YJ300	30	
R202U	ERJ12YJ300	30	
R202V	ERJ12YJ300	30	
R202W	ERJ12YJ300	30	
R202X	ERJ12YJ300	30	
R203A	ERJ12YJ300	30	
R203B	ERJ12YJ300	30	
R203C	ERJ12YJ300	30	
R203D	ERJ12YJ300	30	
R203E	ERJ12YJ300	30	
R203F	ERJ12YJ300	30	
R203G	ERJ12YJ300	30	
R203H	ERJ12YJ300	30	
R203I	ERJ12YJ300	30	
R203J	ERJ12YJ300	30	
R203K	ERJ12YJ300	30	
R203L	ERJ12YJ300	30	
R203M	ERJ12YJ300	30	
R203N	ERJ12YJ300	30	
R203O	ERJ12YJ300	30	
R203P	ERJ12YJ300	30	
R203Q	ERJ12YJ300	30	
R203R	ERJ12YJ300	30	
R203S	ERJ12YJ300	30	
R203T	ERJ12YJ300	30	
R203U	ERJ12YJ300	30	
R203V	ERJ12YJ300	30	
R203W	ERJ12YJ300	30	
R203X	ERJ12YJ300	30	
R204A	ERJ2GEJ330	33	
R204B	ERJ2GEJ330	33	
R204C	ERJ2GEJ330	33	
R204D	ERJ2GEJ330	33	

Ref. No.	Part No.	Part Name & Description	Remarks
R204E	ERJ2GEJ330	33	
R204F	ERJ2GEJ330	33	
R204G	ERJ2GEJ330	33	
R204H	ERJ2GEJ330	33	
R204I	ERJ2GEJ330	33	
R204J	ERJ2GEJ330	33	
R204K	ERJ2GEJ330	33	
R204L	ERJ2GEJ330	33	
R204M	ERJ2GEJ330	33	
R204N	ERJ2GEJ330	33	
R204O	ERJ2GEJ330	33	
R204P	ERJ2GEJ330	33	
R204Q	ERJ2GEJ330	33	
R204R	ERJ2GEJ330	33	
R204S	ERJ2GEJ330	33	
R204T	ERJ2GEJ330	33	
R204U	ERJ2GEJ330	33	
R204V	ERJ2GEJ330	33	
R204W	ERJ2GEJ330	33	
R204X	ERJ2GEJ330	33	
R205A	ERJ2GEJ330	33	
R205B	ERJ2GEJ330	33	
R205C	ERJ2GEJ330	33	
R205D	ERJ2GEJ330	33	
R205E	ERJ2GEJ330	33	
R205F	ERJ2GEJ330	33	
R205G	ERJ2GEJ330	33	
R205H	ERJ2GEJ330	33	
R205I	ERJ2GEJ330	33	
R205J	ERJ2GEJ330	33	
R205K	ERJ2GEJ330	33	
R205L	ERJ2GEJ330	33	
R205M	ERJ2GEJ330	33	
R205N	ERJ2GEJ330	33	
R205O	ERJ2GEJ330	33	
R205P	ERJ2GEJ330	33	
R205Q	ERJ2GEJ330	33	
R205R	ERJ2GEJ330	33	
R205S	ERJ2GEJ330	33	
R205T	ERJ2GEJ330	33	
R205U	ERJ2GEJ330	33	
R205V	ERJ2GEJ330	33	
R205W	ERJ2GEJ330	33	
R205X	ERJ2GEJ330	33	
R206A	ERJ2RKF4700	470	
R206B	ERJ2RKF4700	470	
R206C	ERJ2RKF4700	470	
R206D	ERJ2RKF4700	470	
R206E	ERJ2RKF4700	470	
R206F	ERJ2RKF4700	470	
R206G	ERJ2RKF4700	470	
R206H	ERJ2RKF4700	470	
R206I	ERJ2RKF4700	470	
R206J	ERJ2RKF4700	470	
R206K	ERJ2RKF4700	470	
R206L	ERJ2RKF4700	470	
R206M	ERJ2RKF4700	470	
R206N	ERJ2RKF4700	470	
R206O	ERJ2RKF4700	470	
R206P	ERJ2RKF4700	470	
R206Q	ERJ2RKF4700	470	
R206R	ERJ2RKF4700	470	
R206S	ERJ2RKF4700	470	
R206T	ERJ2RKF4700	470	
R206U	ERJ2RKF4700	470	
R206V	ERJ2RKF4700	470	
R206W	ERJ2RKF4700	470	
R206X	ERJ2RKF4700	470	
R207A	ERJ2RKF6800	680	
R207B	ERJ2RKF6800	680	
R207C	ERJ2RKF6800	680	
R207D	ERJ2RKF6800	680	
R207E	ERJ2RKF6800	680	

Ref. No.	Part No.	Part Name & Description	Remarks
R207F	ERJ2RKF6800	680	
R207G	ERJ2RKF6800	680	
R207H	ERJ2RKF6800	680	
R207I	ERJ2RKF6800	680	
R207J	ERJ2RKF6800	680	
R207K	ERJ2RKF6800	680	
R207L	ERJ2RKF6800	680	
R207M	ERJ2RKF6800	680	
R207N	ERJ2RKF6800	680	
R207O	ERJ2RKF6800	680	
R207P	ERJ2RKF6800	680	
R207Q	ERJ2RKF6800	680	
R207R	ERJ2RKF6800	680	
R207S	ERJ2RKF6800	680	
R207T	ERJ2RKF6800	680	
R207U	ERJ2RKF6800	680	
R207V	ERJ2RKF6800	680	
R207W	ERJ2RKF6800	680	
R207X	ERJ2RKF6800	680	
R208A	ERJ2RHD1601	1.6k	
R208B	ERJ2RHD1601	1.6k	
R208C	ERJ2RHD1601	1.6k	
R208D	ERJ2RHD1601	1.6k	
R208E	ERJ2RHD1601	1.6k	
R208F	ERJ2RHD1601	1.6k	
R208G	ERJ2RHD1601	1.6k	
R208H	ERJ2RHD1601	1.6k	
R208I	ERJ2RHD1601	1.6k	
R208J	ERJ2RHD1601	1.6k	
R208K	ERJ2RHD1601	1.6k	
R208L	ERJ2RHD1601	1.6k	
R208M	ERJ2RHD1601	1.6k	
R208N	ERJ2RHD1601	1.6k	
R208O	ERJ2RHD1601	1.6k	
R208P	ERJ2RHD1601	1.6k	
R208Q	ERJ2RHD1601	1.6k	
R208R	ERJ2RHD1601	1.6k	
R208S	ERJ2RHD1601	1.6k	
R208T	ERJ2RHD1601	1.6k	
R208U	ERJ2RHD1601	1.6k	
R208V	ERJ2RHD1601	1.6k	
R208W	ERJ2RHD1601	1.6k	
R208X	ERJ2RHD1601	1.6k	
R225A	ERJ2GEYJ103	10k	S
R225C	ERJ2GEYJ103	10k	S
R225E	ERJ2GEYJ103	10k	S
R225G	ERJ2GEYJ103	10k	S
R225I	ERJ2GEYJ103	10k	S
R225K	ERJ2GEYJ103	10k	S
R225M	ERJ2GEYJ103	10k	S
R225O	ERJ2GEYJ103	10k	S
R225Q	ERJ2GEYJ103	10k	S
R225S	ERJ2GEYJ103	10k	S
R225U	ERJ2GEYJ103	10k	S
R225W	ERJ2GEYJ103	10k	S
R226A	ERJ2GEJ101	100	S
R226C	ERJ2GEJ101	100	S
R226E	ERJ2GEJ101	100	S
R226G	ERJ2GEJ101	100	S
R226I	ERJ2GEJ101	100	S
R226K	ERJ2GEJ101	100	S
R226M	ERJ2GEJ101	100	S
R226O	ERJ2GEJ101	100	S
R226Q	ERJ2GEJ101	100	S
R226S	ERJ2GEJ101	100	S
R226U	ERJ2GEJ101	100	S
R226W	ERJ2GEJ101	100	S
R227A	ERJ2GEJ101	100	S
R227C	ERJ2GEJ101	100	S
R227E	ERJ2GEJ101	100	S
R227G	ERJ2GEJ101	100	S
R227I	ERJ2GEJ101	100	S
R227K	ERJ2GEJ101	100	S
R227M	ERJ2GEJ101	100	S
R227O	ERJ2GEJ101	100	S
R227Q	ERJ2GEJ101	100	S
R227S	ERJ2GEJ101	100	S
R227U	ERJ2GEJ101	100	S
R227W	ERJ2GEJ101	100	S
R251A	PQ4R10XJ221	220	S
R252	ERJ3GEYJ682	6.8k	
R253	ERJ3GEYJ103	10k	
R254	ERJ3GEYJ682	6.8k	
R255	ERJ3GEYJ103	10k	
R256	ERJ12YJ330	33	
R601	ERJ3GEYJ393	39k	
R602	ERJ2GEYJ103	10k	S
R603	D0GA680JA004	68	
R604	D0GA680JA004	68	
R605	ERJ2GEYJ103	10k	S
R606	ERJ2GEJ220	22	S
R607	ERJ2GEJ220	22	S
R608	D0GA331JA021	330	
R802	ERJ3GEYJ223	22k	
R803	PQ4R10XJ153	15k	S
R804	ERJ3GEYJ223	22k	
R805	PQ4R10XJ752	7.5k	S
R806	ERJ3GEYJ223	22k	
R807	PQ4R10XJ103	10k	S
R808	ERJ3GEYJ332	3.3k	
R809	PQ4R10XJ103	10k	S
R810	ERX1SJR30	0.3	
R811	PQ4R10XJ102	1k	S
R812	ERG1SJ223	22k	
R813	ERJ3GEYJ222	2.2k	
R814	ERJ3EKF2672	26.7k	
R815	ERJ3GEYJ123	12k	
R816	ERJP08J220	22	
R817	PQ4R10XJ220	22	S
R818	ERX1SJ1R5	1.5	
R819	PQ4R10XJ473	47k	S
R820	PQ4R10XJ223	22k	S
R821	ERJ3GEYJ222	2.2k	
R822	ERJ3EKF1242	12.4k	
R823	ERJ3GEYJ123	12k	
R824	ERJP08J220	22	
R825	PQ4R10XJ220	22	S
R826	ERX1SJ1R2	1.2	
R827	PQ4R10XJ752	7.5k	S
R828	PQ4R10XJ153	15k	S
R829	ERJ3GEYJ332	3.3k	
R830	ERX1SJ1R5	1.5	
R831	PQ4R18XJ912	9.1k	S
R832	PQ4R10XJ103	10k	S
R833	ERJ3GEYJ223	22k	
R835	ERX1SJ1R2	1.2	
R836	ERJ3EKF2491	2.49k	
R837	ERJ8GEYJ242	2.4k	
R838	PQ4R10XJ103	10k	S
R839	ERJ3GEYJ223	22k	
R841	ERJ6ENF2742	27.4k	
R842	ERJ3EKF2491	2.49k	
R843	ERJ6ENF2322	23.2k	
R844	ERJ6ENF2742	27.4k	
R845	ERJ6ENF2742	27.4k	
R846	PQ4R10XJ223	22k	S
R847	PQ4R10XJ103	10k	S
R848	PQ4R10XJ103	10k	S
R849	ERG1SJ223	22k	
R851	ERJ3GEYJ222	2.2k	
R852	ERJ3EKF2152	21.5k	
R853	ERJ3GEYJ123	12k	
R854	PQ4R10XJ220	22	S
R855	ERJP08J220	22	
R856	PQ4R10XJ103	10k	S
R857	ERX1SJ1R2	1.2	

Ref. No.	Part No.	Part Name & Description	Remarks
R858	ERJ3GEYJ105	1M	
R860	ERJ8GEYJ202	2k	
R861	PQ4R10XJ682	6.8k	S
R862	ERJ3GEYJ223	22k	
R864	ERJ3EKF2322	23.2k	
R865	ERJ3EKF2491	2.49k	
R866	ERJ3GEYJ222	2.2k	
R867	ERJ3GEYJ222	2.2k	
R868	ERJ3GEYJ272	2.7k	
R869	ERJ3GEYJ333	33k	
R870	ERJ3GEYJ103	10k	
R871	PQ4R10XJ752	7.5k	S
R872	PQ4R18XJ912	9.1k	S
R873	PQ4R10XJ121	120	S
R874	PQ4R10XJ121	120	S